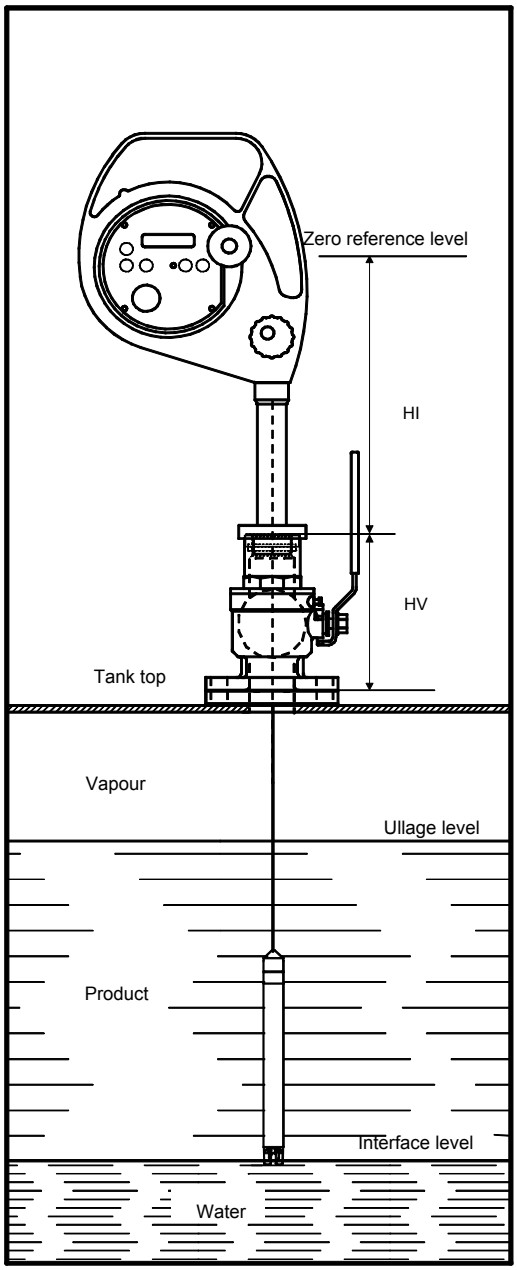
Operation and Service Manual

for HERMetic UTImeter Rtex

TKT adaptors

Portable Electronic Restricted Gauging Device
Ullage - **T**emperature - **I**nterface detector



Note : before using the instrument please read this book.

MED-D DNV Certified Company

Certified System ISO 9001 QMI-SAI Global

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Check updates on www.tanksystem.com or contact us at tanksystem@honeywell.com

1. Table of contents

1. TABLE OF CONTENTS 2

2. GENERAL INFORMATION 4

2.1 SHIPMENT NOTE 4
2.2 INITIAL INSPECTION 4
2.3 DOCUMENTATION DISCREPANCIES 4
2.4 WARRANTY 4
2.5 CERTIFICATION 5
2.6 SPARE PARTS 5
2.7 SERVICE AND REPAIR 5

3. WORLDWIDE SERVICE STATIONS NETWORK ERROR! BOOKMARK NOT DEFINED.

4. RECOMMENDATION FOR SAFE USE 7

5. FUNCTIONS - KEY FEATURES 10

6. DESCRIPTION 11

6.1 GENERAL 11
6.2 ULTRA SENSING PROBE 13
6.2.1 Introduction 13
6.2.2 Ullage detection 13
6.2.3 Interface detection 14
6.2.4 Temperature measurement 14
6.3 TAPE 15
6.4 TAPE PROTECTION 16
6.5 READING INDEX 17
6.6 TAPE CLEANER 18
6.7 ADDITIONAL LOAD (OPTION) 19
6.7.1 Viscous liquids (> 800 Cst) 19
6.7.2 Reference height and innage 19
6.8 OTHERS 19

7. EXAMPLES OF INSTALLATION OF THE GAUGING SYSTEM 20

7.1 GENERAL 20
7.2 INSTALLATION 20

8. OPERATION 21

8.1 BASIC RULES CONCERNING THE 5-KEY CONTROL PAD 21
8.2 SELECTING THE LANGUAGE 22
8.3 SELECTING THE TEMPERATURE SCALE 23
8.4 SELECTING THE TEMPERATURE RESOLUTION 24
8.5 ACTIVATING THE LED 25
8.5.1 Temporary setting of the LED 25
8.5.2 Permanent setting of the LED 25
8.6 MUTING THE BUZZER 26
8.7 BACKLIGHT 26
8.8 CHECKING THE FUNCTIONS BEFORE USING THE INSTRUMENT 27
8.8.1 Battery 27
8.8.2 Temperature 27
8.8.3 Ullage 27
8.8.4 Interface 27
8.9 INSTALLATION OF THE INSTRUMENT 28
8.10 ULLAGE/INTERFACE MEASUREMENT 28
8.11 REFERENCE HEIGHT / INNAGE MEASUREMENT 29
8.12 TEMPERATURE MEASUREMENT 30

9. CARE AND MAINTENANCE 31

9.1 CARE 31
9.2 CHECKING THE BATTERY 32
9.2.1 Before starting gauging 32
9.2.2 During gauging 33
9.3 BATTERY REPLACEMENT 34
9.4 TAPE REPLACEMENT 35
9.4.1 Disconnecting the tape from the sensor 35
9.4.2 Disconnecting the tape from the electronic box 35
9.4.3 Disconnecting the tape from the reel axle 36
9.4.4 Removing the tape from the frame 36
9.4.5 Mounting the new tape 36
9.5 SENSING PROBE REPLACEMENT 37
9.5.1 Disconnecting the old sensing probe . 37
9.5.2 Connecting the new sensing probe 37
9.6 TAPE WIPERS REPLACEMENT 37
9.7 DISPLAY UNIT REPLACEMENT 38
9.7.1 Disconnecting the old display unit 38
9.7.2 Connecting the new display unit 38
9.8 VERIFICATION AND CERTIFICATION OF TAPES 38
9.9 VERIFICATION AND ADJUSTMENT OF THE READING INDEX 39
9.10 TEMPERATURE VERIFICATION 40
9.10.1 Equipment required 40
9.10.2 Preparing the Ice Point bath 40
9.10.3 Checking the UTImeter 40
9.11 ULLAGE/INTERFACE VERIFICATION 41

10. TROUBLE SHOOTING 42

10.1 SAFETY WARNING 42
10.2 POWER SUPPLY TROUBLES 42
10.3 TRANSMISSION TROUBLES 42

10.4 ULLAGE AND/OR INTERFACE TROUBLES 43
10.5 TEMPERATURE TROUBLES 43
10.6 VISUAL INSPECTION FOR DAMAGED OR MISSING PARTS 43
10.7 COATED ALUMINIUM PARTS..... 44
10.8 ELECTRICAL CHECKING OF THE TAPE ASSEMBLY 44

11. SPECIFICATIONS 45

12. SPARE PARTS 46

12.1 HOW TO PROCEED 46
12.2 LIST OF PARTS DESCRIPTIONS..... 46
12.3 SPARE PARTS DRAWINGS & DECLARATION OF CONFORMITY 48

2. General information

2.1 Shipment note

The following parts should be included in the shipment:

- 1 instrument fitted out with one battery in the display;
- 1 set of 4 Allen keys: 1.5, 2, 2.5 and 3 mm;
- 1 Operation and Service Manual.

2.2 Initial inspection

Check the contents of the shipment for completeness and note whether any damage has occurred during transport. Carry out the “Initial test before installing the instrument” to verify the good functioning. If the contents are incomplete, or if there is a damage, do not use the device. A claim should be filled with the carrier immediately, and Enraf Tanksystem SA Sales or Service organization should be notified in order to facilitate the repair or replacement of the instrument.

2.3 Documentation discrepancies

The design of the instrument is subject to continuous development and improvement. Consequently, the instrument may incorporate minor changes in detail from the information contained in the manual.

2.4 Warranty

Three (3) years after installation but max. 42 months after delivery ex works except batteries.

The Vendor undertakes to remedy any defect resulting from faulty design materials or workmanship. The Vendor's obligation is limited to the repair or replacement of such defective parts by his own plant or one of his authorized service stations. The Purchaser shall bear the cost and risk of transportation of defective parts and repaired parts supplied in replacement of such defective parts.

When returned to Enraf Tanksystem SA or any of its agreed Service Stations equipment must be contamination-free. If it is determined that the Purchasers equipment is contaminated, it will be returned to the Purchaser at the Purchasers expense. Contaminated equipment will not be repaired, replaced, or covered under any warranty until such time that the said equipment is decontaminated by the Purchaser.

The Purchaser shall notify by fax, telex or in writing of any defect immediately upon discovery, specifying the nature of the defect and/or the extend of the damage caused thereby.

Where no other conditions have been negotiated between the Vendor and the Purchaser "General Conditions 188" of United Nations shall apply.

This instrument has been certified as Intrinsically Safe Instrumentation for only those classes or categories of hazardous areas stated on the instrument label, bearing the mark of the applicable approval authority. No other usage is authorized.

Unauthorized repair or component replacement by the Purchaser will void this guarantee and may impair the intrinsic safety of the instrument. In particular it is not allowed to repair electronic circuits.

In no event shall Enraf Tanksystem SA be liable for indirect, incidental or consequential loss or damage or failure of any kind connected with the use if its products or failure of its products to function or operate properly.

Enraf Tanksystem SA do not assume the indemnification for any accident or damage caused by the operation of its product and the warranty is limited to the replacement of parts or complete goods.

2.5 Certification

Enraf Tanksystem SA is an ISO 9001 certified company by QMI and MED-D by Det Norske Veritas Certification GmbH.

The equipment has been approved for the electrical intrinsic safety by the following authorities :

IECEx
Zone 0 Ex ia IIB T4 20°C < Ta < +50°C
Standards used:
IEC 600790, Fourth Edition 200401,
IEC 6007911, Fifth Edition 200607
IEC 6007926, First Edition 200403

ATEX
II 1 G EEx ia IIB T4 / Tamb. 50 °C
Standards used:
EN50014, (1997) + Amds 1 & 2
EN50020, (2002)
EN50284, (1999)

Regarding product compliance against standards updates or new standards, please refer to the Declaration of conformity.

Factory Mutual (FM Approvals)
CL I, DIV 1, GP C&D, T4 Tamb. 50 °C and
CL I, ZN 0, AEx ia IIB T4 Tamb. 50 °C

The equipment has been approved as oil/water interface detector according to MARPOL Resolution MEPC.5(XIII) of 13 June 1980 by National Maritime Authorities and/or Classification Societies.

If you need a copy of any of these certificates please contact:

Enraf Tanksystem SA
Rue de l'industrie 2
1630 Bulle, SWITZERLAND

Telephone : +41-26-91 91 500
Telefax : +41-26-91 91 505
Web site : www.tanksystem.com
E-mail : tanksystem@honeywell.com

2.6 Spare parts

When ordering spares identify the spare part by TS number and description. Refer to section “Drawings”.

Some spares might be repairable; in this case send the part(s) to any authorised service center or to the factory.

In case of urgency, complete replacement units can be made available. Contact the factory or nearest Service Station for details.

2.7 Service and Repair

The customer is responsible for any freight and customs clearance charges. If units are sent on a "freight collect" the charges will be invoiced to the customer.

When returning units or parts for repair to the factory please fill out a service request form (see next page). The serial number (letter "R" followed by 5 digits) is printed on the identification plate as shown on the Figure 6-1.

When returned to Enraf Tanksystem SA equipment must be contamination-free. If it is determined that the customers equipment is contaminated, it will be returned to the customer at the customers expense. Contaminated equipment will not be repaired until such time that the customer decontaminates the said equipment.

Service Request

Customer's address: .....
.....
.....
.....
.....

Telephone: .....

E-mail: .....

Fax: .....

Type of unit or part: .....
.....

Serial number: .....

Short description of trouble: .....
.....
.....
.....

Do you want a quotation before repair is started:.....yes / no.....

Repaired unit has to be returned to the following address:

.....
.....
.....
.....
.....

3. Worldwide Service Stations network

The updated list can be found on our website www.tanksystem.com

COUNTRY	ADDRESS	TELEPHONE/FAX/E-MAIL
SWITZERLAND	ENRAF TANKSYSTEM SA 2, rue de l'Industrie CH-1630 BULLE	Tel : +41-26-91 91 500 Fax : +41-26-91 91 505 Tanksystem@honeywell.com
CANADA	PYLON ATLANTIC A Div. Of Pylon Electronics Inc. 31 Trider Crescent., DARTMOUTH, N.S. B3B 1V6	Tel : +1-902-4683344 Fax : +1-902-4681203 halifax_csr@pylonelectronics.com
CHINA	HUA HAI EQUIPMENT & ENGINEERING CO LTD Factory 7, Lane 1365, East Kang Qiao Road Kang Qiao Industrial Zone, Pu Dong SHANGHAI, P.C. 201315	Tel : +86-21-68183183 Fax : +86-21-68183115 huahaish@huahaiee.com
GERMANY	CHRISTIAN BINDEMANN MARINE CONSULTING Antonie-Möbis-Weg 4 HAMBURG 2523	Tel : +49-40-41918846 Fax : +49-40-41918847 service@mkecb.com
GREECE	SPANMARIN 86, Filonos Street GR-185 36 PIRAEUS	Tel : +30-210-4294498 Fax : +30-210-4294495 spanmarin@ath.forthnet.gr
JAPAN	DAIWA HANBAI CORPORATION LTD 2-10-31, Mitejima, Nishiyodogawa-ku OSAKA 555-0012	Tel : +81-6-64714701 Fax : +81-6-64729008 daiwa471@silver.ocn.ne.jp
KOREA	World Ocean CO., LTD Rm1001, Hae-deok Bldg., 1212-11 Choryang-dong Dong-Gu BUSAN	Tel : +82-51-462-2554/5 Fax : +82-51-462-0468 info@worldocean.co.kr
MEXICO	URBAN DEL GOLFO S.A. DE C.V. Ave. Ejército Mexicano 1902 Col. Loma del Gallo 89460 CD. MADERO, TAMPS. MEXICO	Tel : +52-833-2170190 Fax : +52-833-2170190 urbansa@prodigy.net.mx
NETHERLANDS	B.V. TECHNISCH BUREAU UITTENBOGAART Brugwachter 13 NL-3034 KD ROTTERDAM	Tel : +31-10-4114614 Fax : +31-10-4141004 info@tbu.nl

The updated list can be found on our website www.tanksystem.com

COUNTRY	ADDRESS	TELEPHONE/FAX/E-MAIL
PORTUGAL	CONTROLIS Soc. Com. Equipamentos de Controlo, Lda. Rua Conceiçao Sameiro Antunes, 26E 2800-379 COVA DA PIEDADE	Tel : +351-21-2740606 Fax : +351-21-2740897 controlis@netc.pt
RUSSIA	NPP "GERDA" Vilisa Latsisa str. 17 Building 1 125480 MOSCOW	Tel : +7-495-7558845 Fax : +7-495-7558846 info@gerda.ru
SINGAPORE	HUBBELL INT'L (1976) PTE LTD 322 Thomson Road SINGAPORE 307665	Tel : +65-6-2557281 Tel : +65-6-2550464 Fax : +65-6-2532098 hubbell@mbox2.singnet.com.sg
SPAIN	E.N.I. Electronica y Neumatica Industrial, S.A. C/Jon Arrospide, 20 (Int.) 48014 BILBAO	Tel : +34-94-4746263 Fax : +34-94-4745868 eni.tecnica@eni.es
SWEDEN	INSTRUMENTKONTROLL Lars Petersson AB Varholmsgatan 1 414 74 GÖTEBORG	Tel : +46-31-240510 Tel : +46-31-240525 Fax : +46-31-243710 Info@instrumentkontroll.se
TURKEY	YEDI DENIZ Setustu, Izzetpasa Yok.1 TR 34427 Kabatas ISTANBUL	Tel : +90.212.251 64 10 / 3 lines Fax : +90.212.251 05 75 servicestation@yedideniz.net dmgistanbul@yahoo.com
UNITED ARAB EMIRATES	MARITRONICS TRADING L.L.C. P.O. Box 6488 Shed # 72, Jadaf Ship Docking Yard DUBAI	Tel : +971-4-3247500 Fax :+971-4-3242500 service@maritronics.com
UNITED KINGDOM	ENERGY MARINE (INTERNATIONAL) LTD. 12 Clipstone Brook Industrial Estate Cherrycourt Way LEIGHTON BUZZARD, BEDS LU7 4TX	Tel : +44-1525-851234 Fax :+44-1525-852345 info@engmar.com
U.S.A / TEXAS	HONEYWELL HERMETIC 4522 Center Street DEER PARK, TX 77536	Tel : +1-281-930 1777 Fax : +1-281-930 1222 Toll free call in the USA: 1-800-900 1778 hermetic@honeywell.com

4. Recommendation for safe use

1. This Operation and Service Manual is a guide in order to help the user to operate the instrument to our best knowledge.

2. Nevertheless the maker disclaims all responsibility and liability for damage resulting from the use of the equipment regardless of the cause of the damage.

3. **Attention is drawn to the possible hazard due to electrostatic charges which may be present in the tank.** This may happen in particular with static accumulator liquids, i.e. liquids which have low conductivity of 50 picoSiemens/metre (pS/m) or less.

4. **It is very important that the instrument is grounded to the tank before the probe is introduced into the tank and remains grounded until after complete withdrawal from the tank.**

   4.1. ~~If the instrument is installed with the quick connect coupler, grounding is effected through the quick connect coupler and the mating nipple of the valve provided that these parts are kept clean and free from corrosion in order to guarantee electrical conductivity. If a grease is used for this purpose, it must be one which contains graphite.*~~

   4.2. ~~If the instrument is not connected to the mating deck valve~~ *, the instrument has to be ~~also~~* earthed by means of the grounding cable and clamp.

*** WITH TKT APDAPTORS THE USE OF THE GROUNDING CABLE IS MANDATORY.**

5. **It is anticipated that the user will have specific operating methods laid down to ensure safety when using this type of apparatus. In this case the user's instructions shall be strictly observed.**

6. **In the absence of such instructions the following should be noted:**

   6.1. If a metal sounding pipe is fitted beneath the deck valve or tank is inerted, then ullaging, etc. is permissible at any time with no restriction.

   6.2. If there is no sounding tube or tank is not inerted, the following precautions shall be taken:

      6.2.1. If the cargo is not a static accumulator liquid, i.e. its conductivity is more than 50 pS/m, then ullaging is permitted provided that the instrument is properly grounded and earthed before the probe is inserted into the tank and remains earthed until the probe has been removed from the tank.

      6.2.2. If the cargo is a static accumulator liquid, i.e. its conductivity is less than 50 pS/m, then ullaging is permitted provided that:

         6.2.2.1. The instrument is properly grounded and earthed before the probe is inserted into the tank and remains earthed until the probe has been removed from the tank.
         6.2.2.2. The apparatus is not introduced into a tank until at least 30 minutes have elapsed after completion of any loading operation or stopping the injection of inert gas.

   6.3. For further guidance refer to International Safety Guide for Oil Tankers and Terminals (ISGOTT), ISBN 10 85609 291 7, Fith Edition 2006, or consult the appropriate Legislative Authority for the installation.

7. **Warning: change of battery must be carried out in safe area only (non flammable atmosphere).**

8. **This product and his use is / may be related to international, national, local or company regulations or standards. It is the customer / user responsibility to ensure that the way to use the device complies with such applicable regulations or standards.**

9. **This device is a portable product. It must not be permanently installed on the tank and must be disconnected after use and stored in a safe and dry area.**

5. Functions - Key Features

This HERMetic instrument is a portable multiple functions gauging system that is designed to perform under restricted conditions in a single operation 3 measurements:

a) **U**llage (outage). Optionally innage is available[1].

b) Oil/water **I**nterface level.

Tape resolution: 1 mm (*1/16* ")
Tape accuracy: ±1.5 mm for 30 m
(±*1/16* " approx. for 100 feet)
Ullage/interface detection accuracy:
±2 mm (±*0.08* " approx.)
Minimum detectable tank bottom interface or liquid level: 4 mm (0.16" approx.).

c) **T**emperature by continuous reading at any level.

Ambient temperature range: -20°C to 50°C
(-4°F to 122°F)

Sensor measurement range:-40°C to 90°C
(-40°F to 194°F)

Resolution: 0.01° or 0.1°, selectable

Accuracy over calibration range: ±0.1°C (0°C to 70°C); ±0.2°F (32°F to 158 °F)

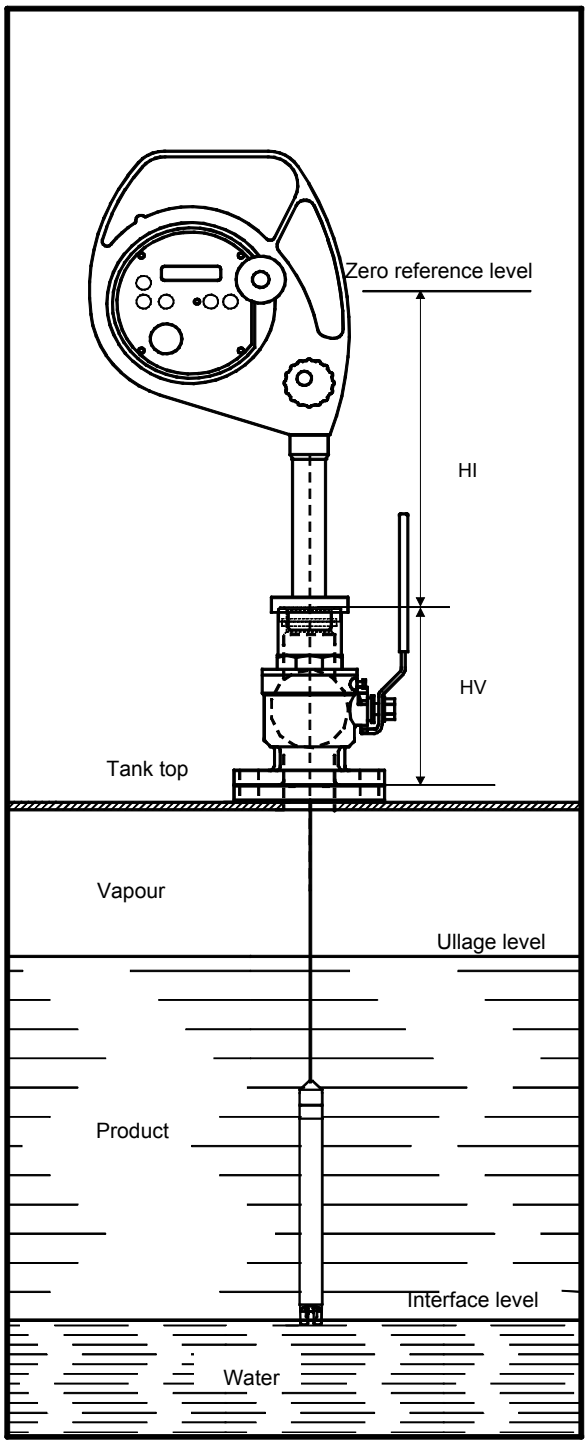
Temperature reading: °C or °F, selectable.

This HERMetic device meets the requirements of API MPMS Chapter 7 2001, table 3, ISO 4268 and IP PMM Part IV.

Thanks to the small diameter of the sensing probe this instrument can be used with valves of diameters down to 25 mm (1") only.

~~A tape protection tube prevents closing the valve on the tape through inadvertence.~~

[1] An additional device, usable with 2" valves only, can be provided that allows **Reference Height** and **Innage** measurement. Available on "Visc" models.



6. Description

6.1 General

Each HERMetic instrument is **individually identified** with a 6 digits serial number starting with the letter R, example R10058. This serial number is printed on the identification plate as shown on Figure 6-1.

The HERMetic instrument is fitted with an **ULTRA** sensing probe.

The unit emits control beep, continuous beep and intermittent beep.

When the sensing probe is surrounded by air, a control beep occurs every 2 sec.

When the sensing probe is in contact with any petroleum product, the beep is continuous.

When the sensing probe is in contact with water the beep is intermittent.

Control beep	• •
Continuous beep	• • • • • • • • • •
Intermittent beep	• • • • • •

A light signal (LED) can also be activated that blinks at the same frequency as the buzzer tones. This can be useful in noisy environments or at night.

A backlight can be used at night to light up the display.

The HERMetic instrument is powered by a 9 Volt battery stored in the electronic terminal named instrument unit. Current consumption is very low, ensuring long operation without battery replacement. **A continuous tone means that the battery needs replacement**. If the battery power is too low, it is no more possible to read the temperature.

Maintenance is easy because design is modular and allows quick exchange of parts.

See also Figure 6-2 to get to know the equipment.

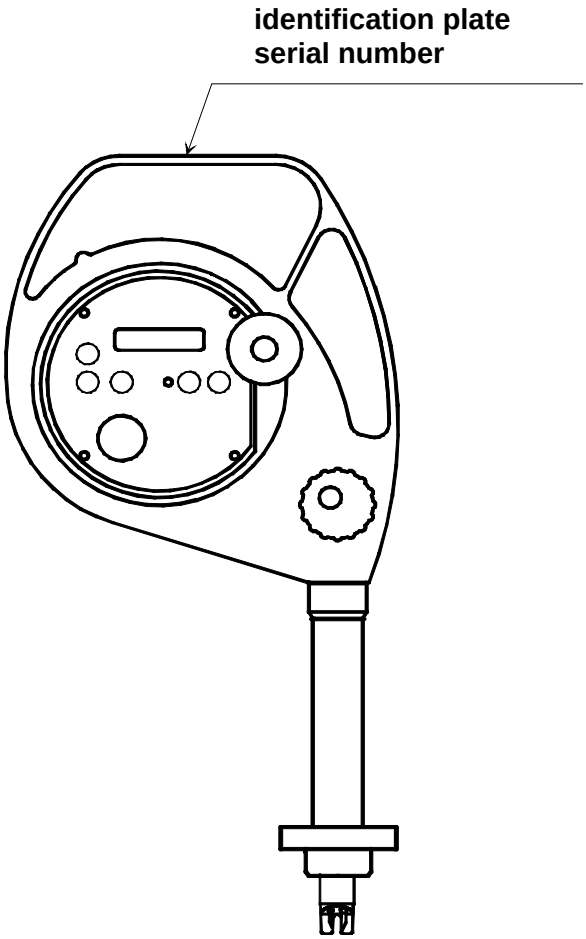


Figure 6-1

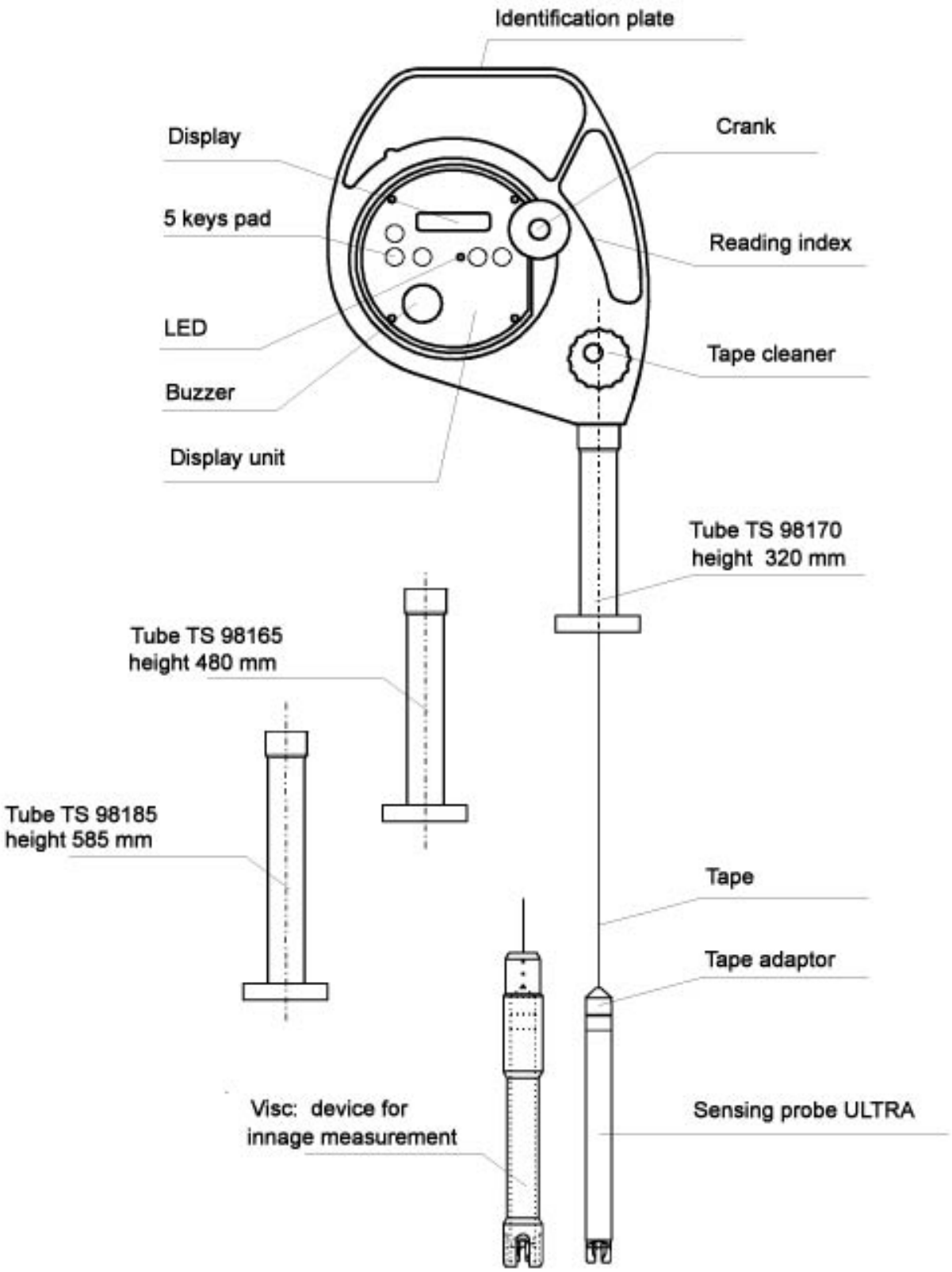

Identification plate
Display
Crank
5 keys pad
Reading index
LED
Tape cleaner
Buzzer
Display unit
Tube TS 98170
height 320 mm
Tube TS 98165
height 480 mm
Tube TS 98185
height 585 mm
Tape
Tape adaptor
Visc: device for
innage measurement
Sensing probe ULTRA

Figure 6-2

6.2 ULTRA sensing probe

6.2.1 Introduction

The ULTRA sensing probe consists of a stainless steel tube terminated by a high-tech plastic head which cannot be removed from the tube. The sensing probe includes an ultrasonic liquid level sensor, a temperature sensor and a conductivity electrode. The sensitivity for ullage and interface measurement is not adjustable. The temperature measurement is calibrated at the factory and does not require subsequent adjustment.

6.2.2 Ullage detection

The ullage detector consists of two piezoceramic plates and electronic circuits. When the sensor head is immersed in a non-conductive liquid (oil or petroleum), the emitted ultrasonic signal is detected by the receiver, coded and sent to the instrument unit which activates the buzzer with the continuous beep.

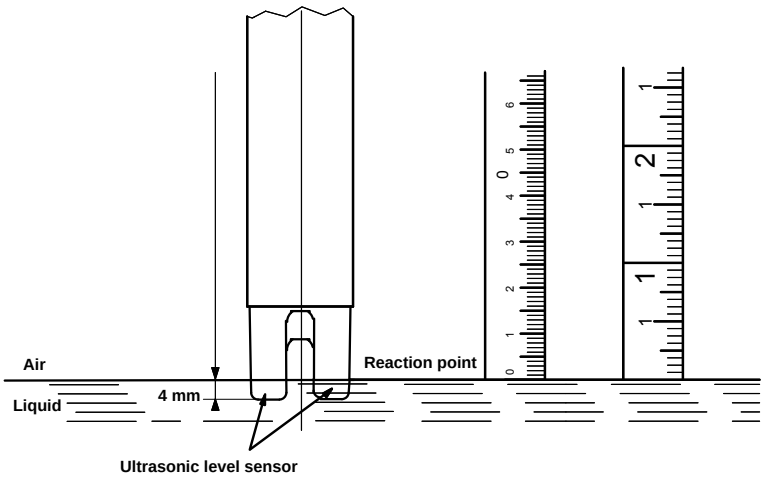


Figure 6-3

The reaction point is located 4 mm (5/32") from the sensor bottom and identical with the zero-point of the tape graduation.

6.2.3 Interface detection

The principle consists of a conductivity measurement between an active electrode and a grounded electrode. When the liquid is conductive (as water), the ullage sensor detects the presence of the liquid as well and the conductivity electrodes and associated electronic circuits modulate the coded signal to generate the intermittent beep.

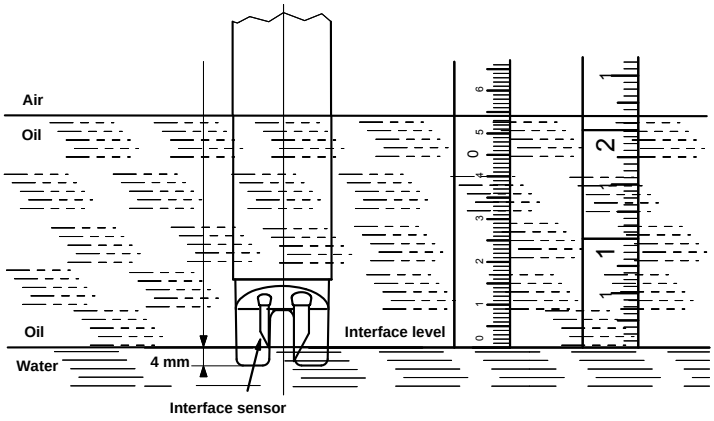


Figure 6-4

The reaction point is located 4 mm (5/32") from the sensor bottom and identical with the zero-point of the tape graduation.

6.2.4 Temperature measurement

The sensing element is a Platinum Resistance Temperature Detector (RTD) element. The element is located in the temperature electrode, which is filled in with a heat transfer compound paste to reduce the response time.
The RTD element signal is digitized, and then all errors (offset, non-linearity and drift) are corrected and compensated by the micro-controller located in the sensor probe. The RTD element characteristics are stored in the sensor memory and are dedicated to one sensor. For this reason, changing a sensor does not require a new calibration.
All data are serialised and sent by the micro-controller to the Display Unit.
Temperature settings (resolution, scale) are easy to select by pressing the 5-key control panel.

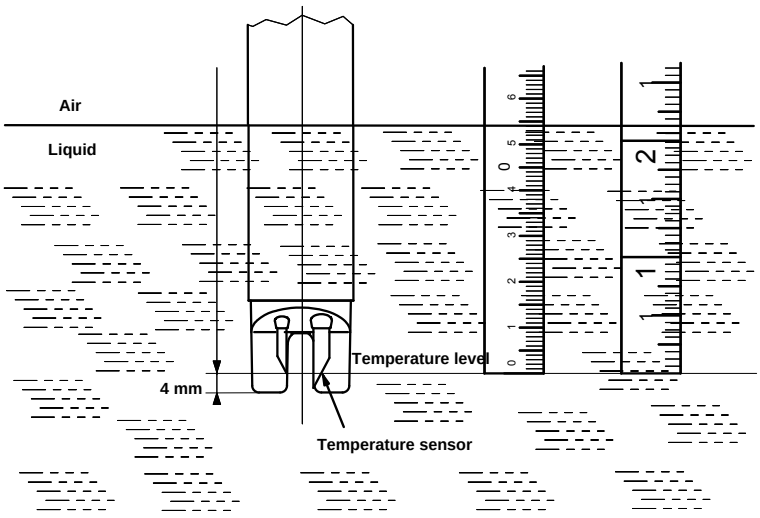


Figure 6-5

The reaction point is located 4 mm (5/32") from the sensor bottom and identical with the zero-point of the tape graduation.

6.3 Tape

The ETFE (TEFZEL) coated tape provides 3 main functions :

- It holds the sensing probe.
- It is graduated and therefore makes it possible to determine the distance between the reaction point and the reading index. If the reading index is set up at the zero ullage level, the reading of the tape is identical to the ullage.
- It contains 2 wires for transmitting the signal and the power between the display unit and the probe. The steel tape itself is used as a grounding wire between the sensing probe tube and the display unit.

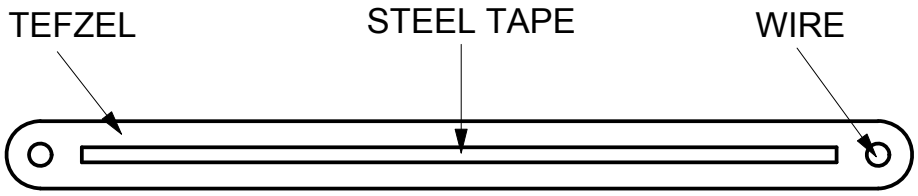


Figure 6-6

The standard graduation is a double side type that shows the metric graduation on one side and the inch one on the other side. The tape is mounted on the equipment according to the need.

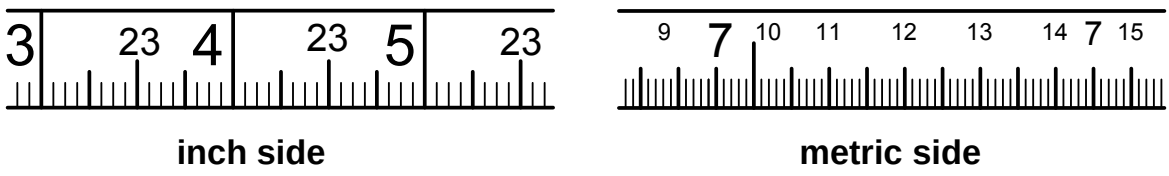


Figure 6-7

6.4 Tape protection

~~The tape protection tube is a mechanical safety device which prevents the valve from being closed as long as the sensing probe is inside the tank. When the sensing probe is lowered the protection tube will follow the sensing probe by gravity until the tube is retained by a ring located inside the coupler. In that position the protection tube prevents closing the valve. When the tape is wound up the protection tube will stay in position until it is pushed up by the sensing probe. Before instrument is used check that the protection tube is moving freely. For cleaning purposes the protection tube is slotted.~~

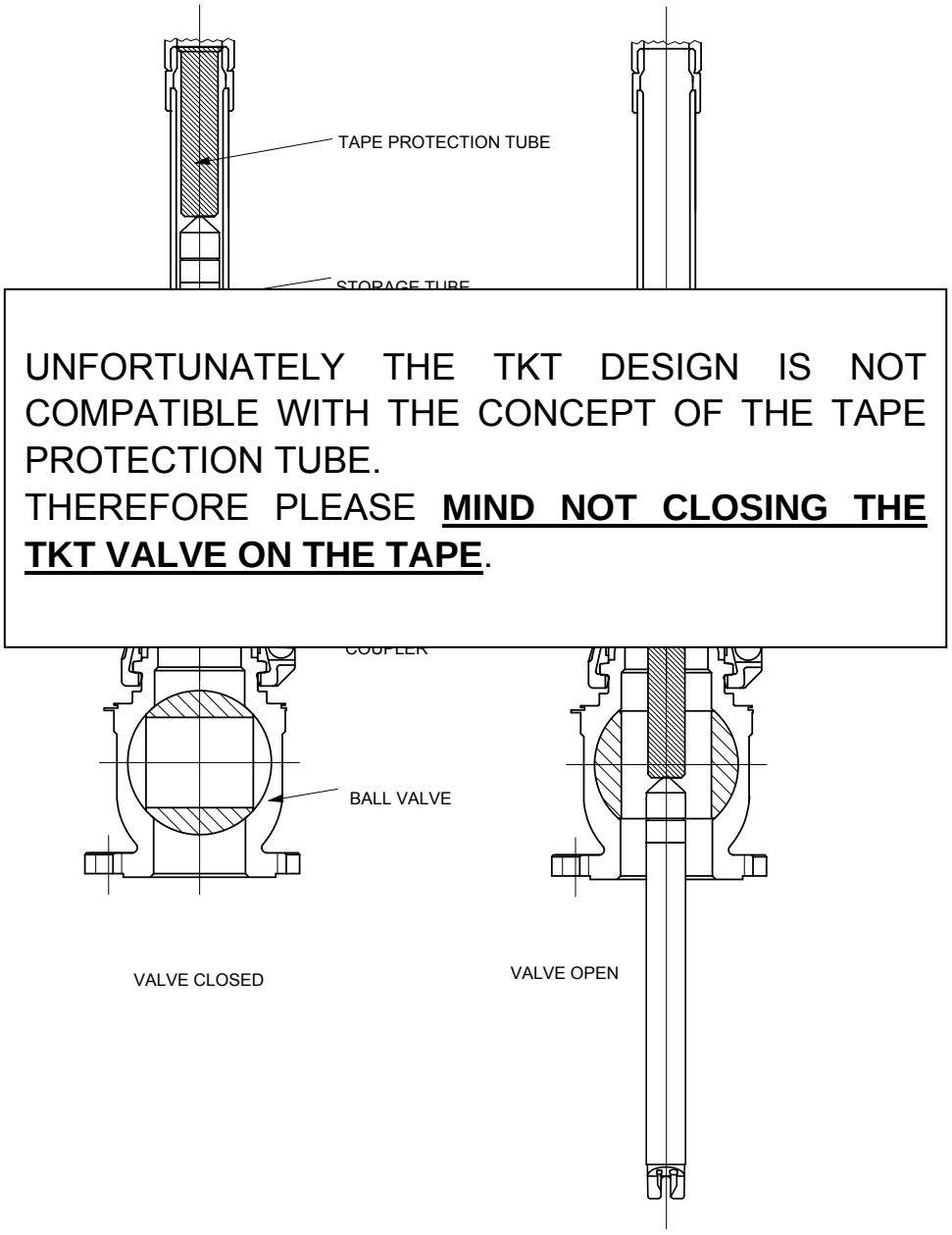

TAPE PROTECTION TUBE
UNFORTUNATELY THE TKT DESIGN IS NOT COMPATIBLE WITH THE CONCEPT OF THE TAPE PROTECTION TUBE.
THEREFORE PLEASE MIND NOT CLOSING THE TKT VALVE ON THE TAPE.
BALL VALVE
VALVE CLOSED
VALVE OPEN

Figure 6-8

6.5 Reading index

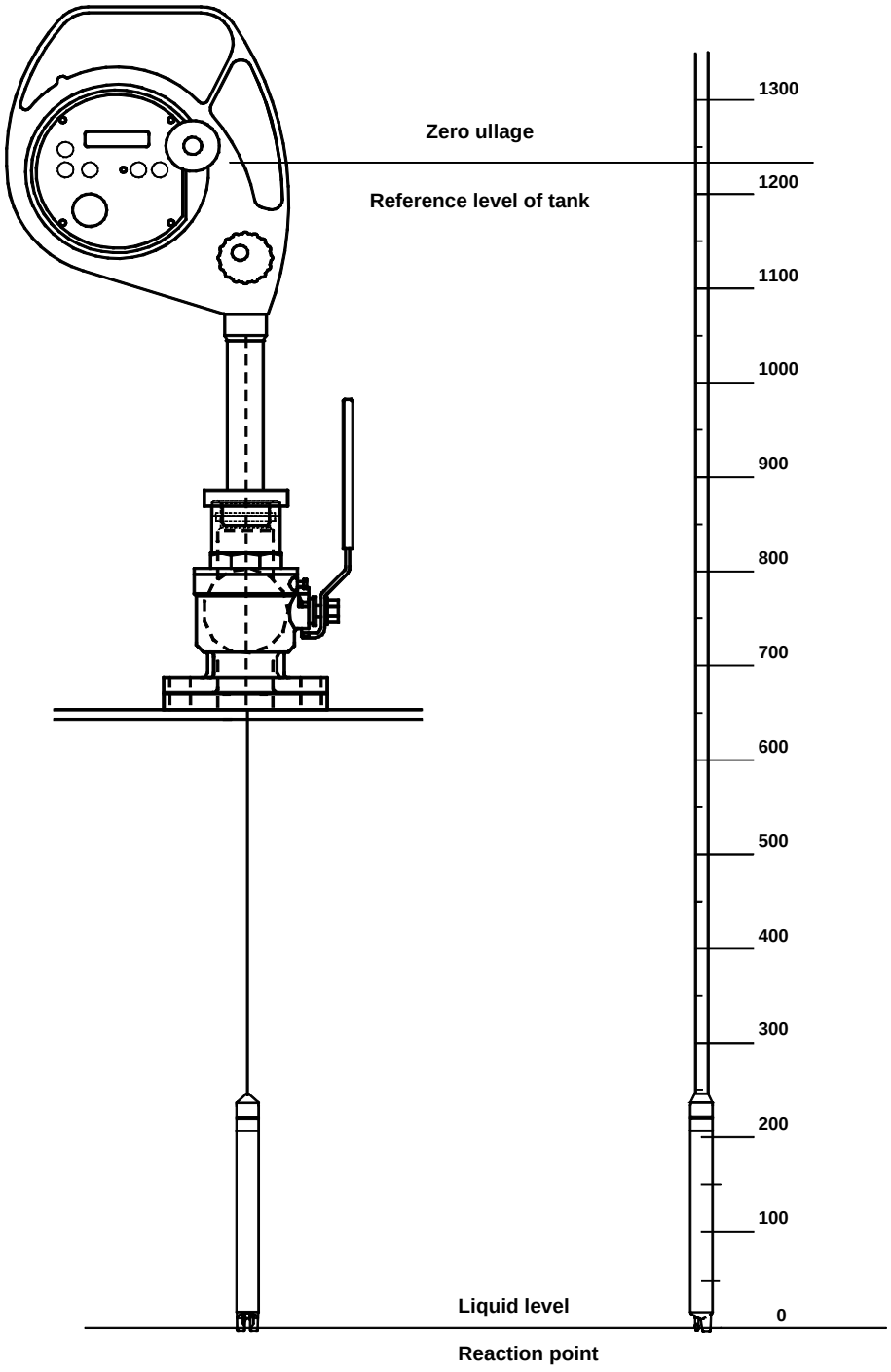


Figure 6-9

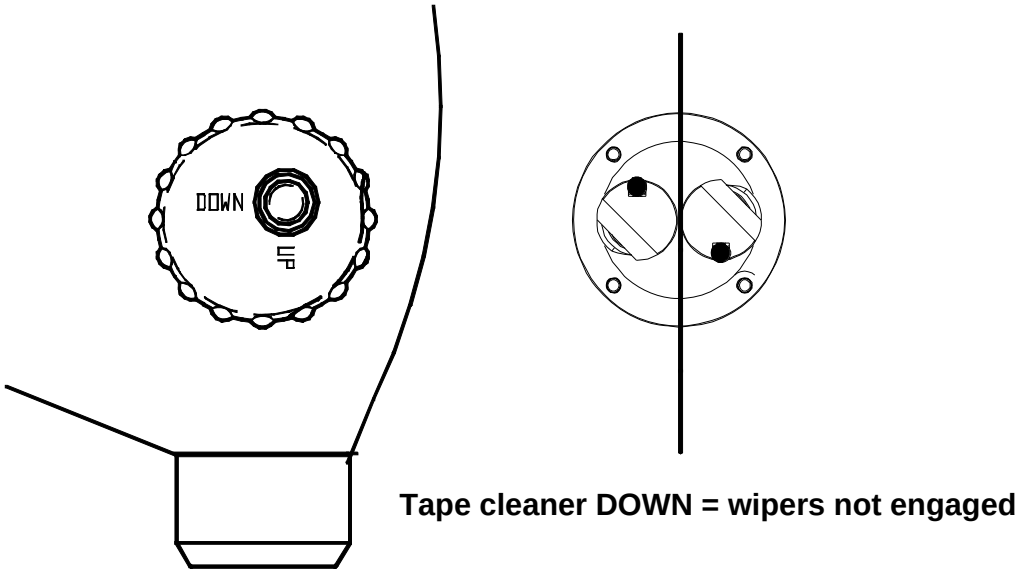
The tape reading at the height of the reading index of the instrument is indicating the distance between the reaction point and the reading index.
If the instrument is installed in such a way that the reading index is at the same level as the zero-ullage reference level the reading of the tape corresponds to the ullage providing the reaction point of the sensing probe is positioned at the liquid level.
If the reading index is positioned below or above the reference level a positive or negative correction of the tape reading is necessary.
See also chapter 7 “Examples of installation of the gauging system”.

6.6 Tape cleaner

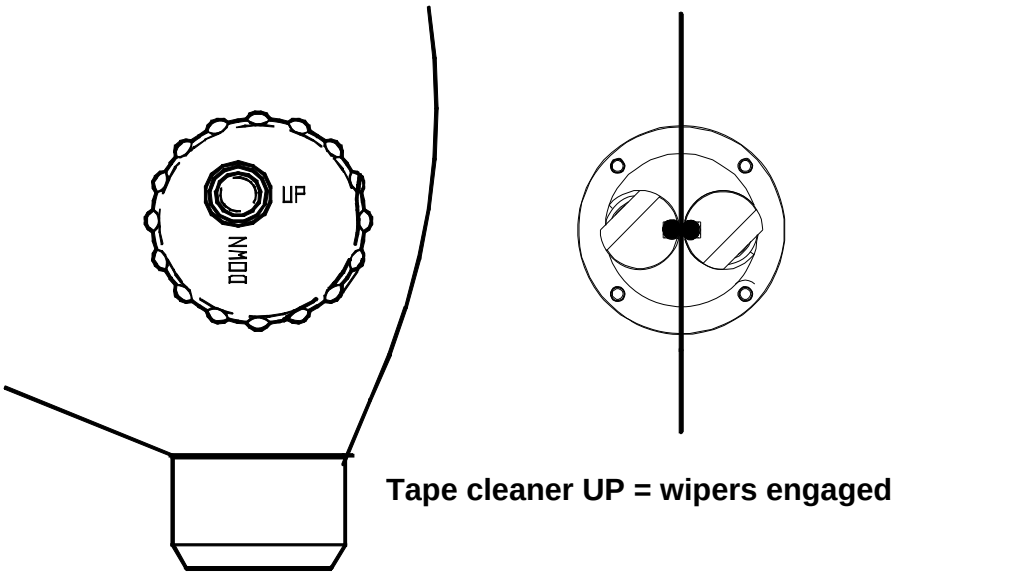
This HERMetic equipment is fitted with a tape cleaner that helps draining the liquid back to the tank when rewinding the tape. It is very easy to operate:

- position "DOWN": the wipers are not working, the tape is free;
- position "UP": the wipers are cleaning the tape.

Refer to Figure 6-10.



Tape cleaner DOWN = wipers not engaged



Tape cleaner UP = wipers engaged

Figure 6-10

6.7 Additional Load (option)

An additional load (see Figure 6-2) on the sensing probe can be provided for one of the following reasons. This option is available on UTImeter Rtex Visc equipped with the storage tube Q2 (2") and needs valves of at least 2" size.

6.7.1 Viscous liquids (> 800 Cst)

For gauging viscous liquids the load can help the sensing probe in penetrating the liquid and in keeping the tape straight.

6.7.2 Reference height and innage

For measuring the reference height of a tank and innages the load allows the sensing probe to touch the dip/datum plate.

6.8 Others

The tape is coiled on a reel which holds also the electronic box and the display unit.

The reel is assembled to the electronic box and can be locked at discrete positions by means of a stopping mechanism in the crank. Pull the crank to free the stopping mechanism.

The external reel flange and the frame are made in aluminium coated with polyamid PA 11 (RILSAN).

The storage tube is threaded to the frame.

The storage tube is equipped with a connector which fits on the MMC valves.

7. Examples of installation of the gauging system

7.1 General

The equipment you have ordered is mounted with a TKT adaptor, in order to fit the relevant TKT valve.

Please consult the TKT documentation to check what is the distance between the valve and the reading index of the gauge.

There should be no internal tank structure between the valve outlet and the tank bottom such that will impede the path of the equipment into the tank.

All valves shall be installed at the same level.

Small systematic level error can be corrected by adjusting the reading index accordingly.

When designing the gauging port and to avoid damaging the tape during rewinding it is advised to chamfer or to grind all sharp edges (on pipes, flanges, etc.) that could damage the tape when operating the gauge.

7.2 Installation

The HERMetic equipment can be provided with 3 adaptors, as shown below.

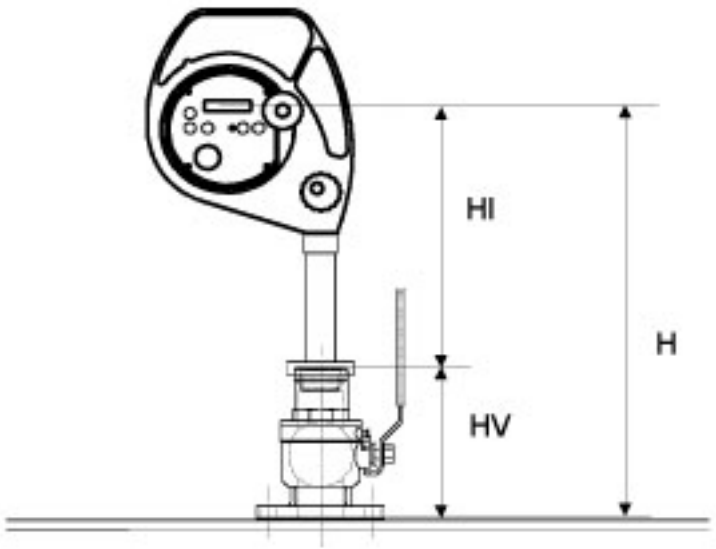


Figure 7-1

Storage Tube	HV	HI	H
TS 98170	180	320	500
TS 98165	180	480	660
TS 98185	180	585	765

8. Operation

8.1 Basic rules concerning the 5-key control pad

Apart from the "ON" / "OFF" keys that are self-explanatory, there are 3 other keys that help in customising the unit:

- pressing "+" allows to scroll down the menus, a pointer show the actual menu you have selected,
- pressing "-" allows to exit a menu,
- pressing "enter" (later on named "E") allows to enter a specific menu.

The small pointer displayed on the left is showing the active setting.

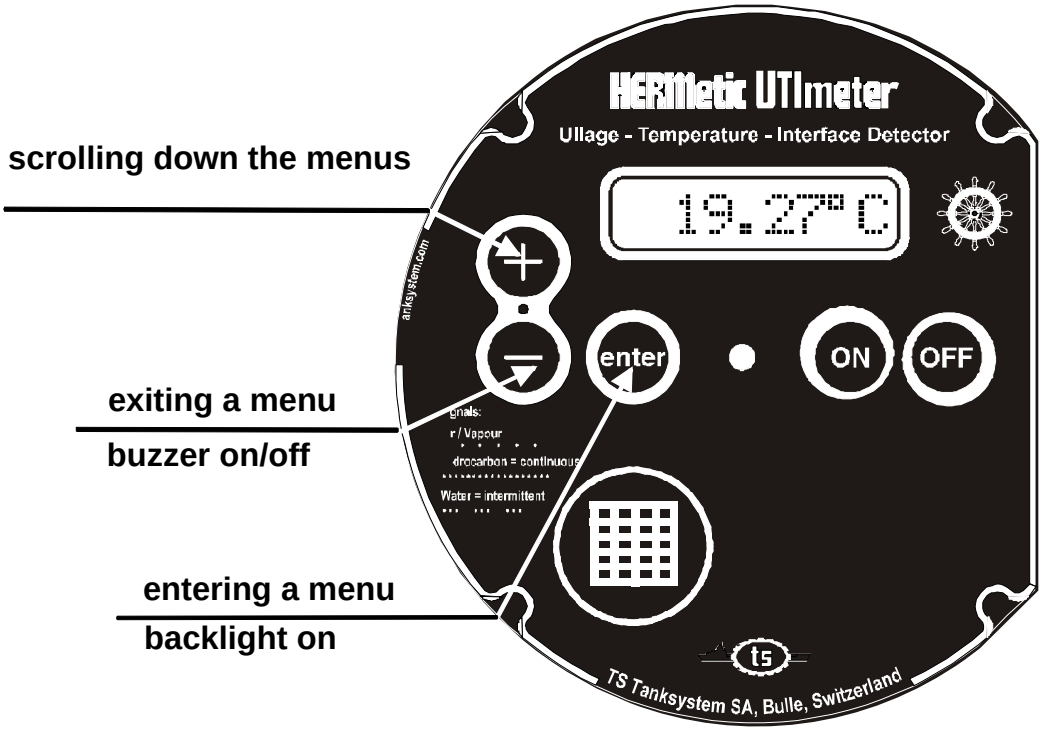


Figure 8-1

8.2 Selecting the language

English, German or French languages can be selected by following the sequences described in Figure 8-2.

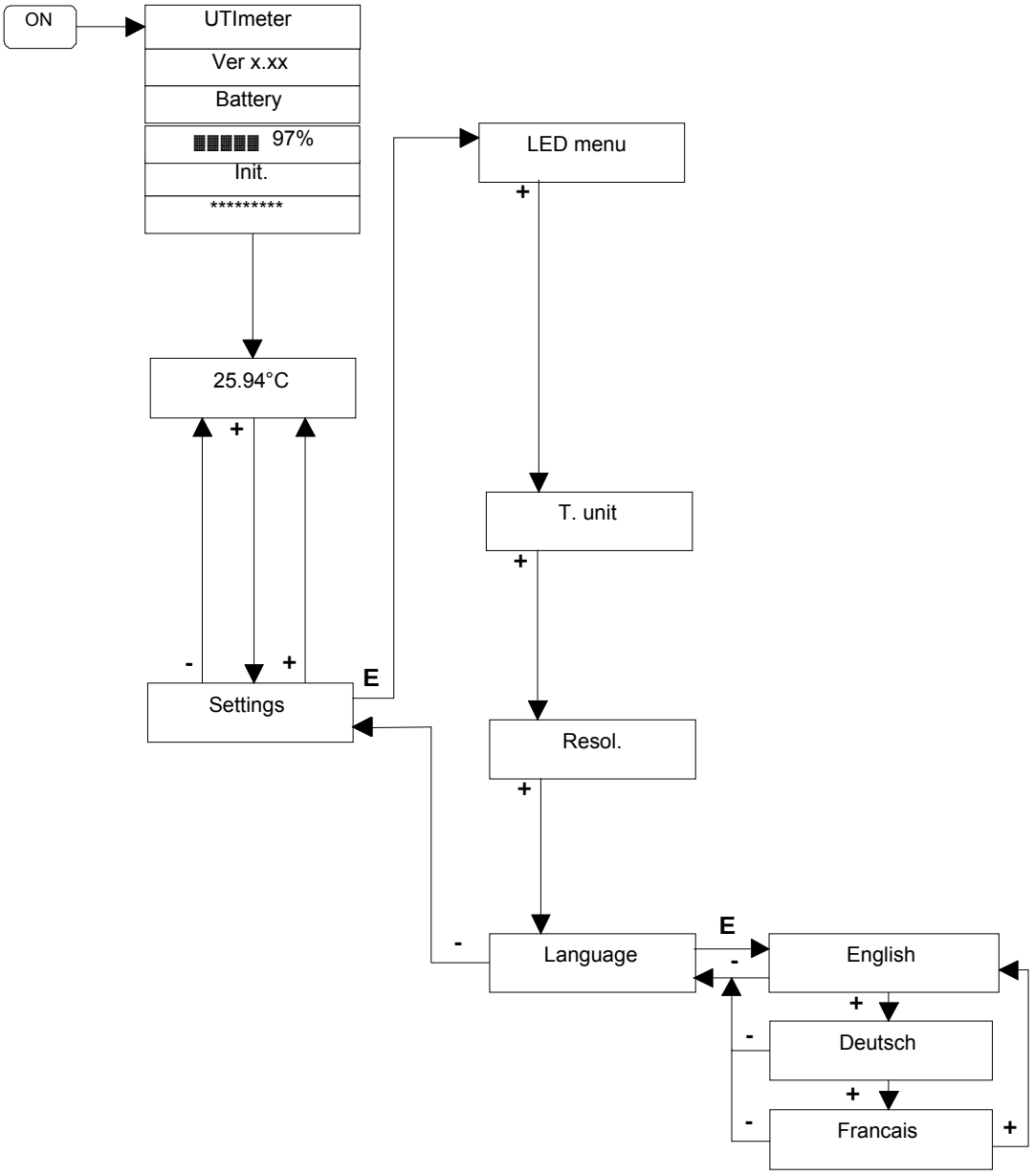


Figure 8-2

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter", "LED menu" is displayed,
- Press on "+"; "T. unit" is displayed,
- Press on "+", "Resol." is displayed,
- Press on "+", "Language." is displayed,
- Press on "enter",
- Select the language by pressing on "+" one or more times, the display shows the language selected,
- Press "-" two times to come back in measurement mode.

The new setting is stored in the permanent memory.

8.3 Selecting the temperature scale

The temperature can be displayed either in Celsius or Farenheit degrees. Refer to Figure 8-3.

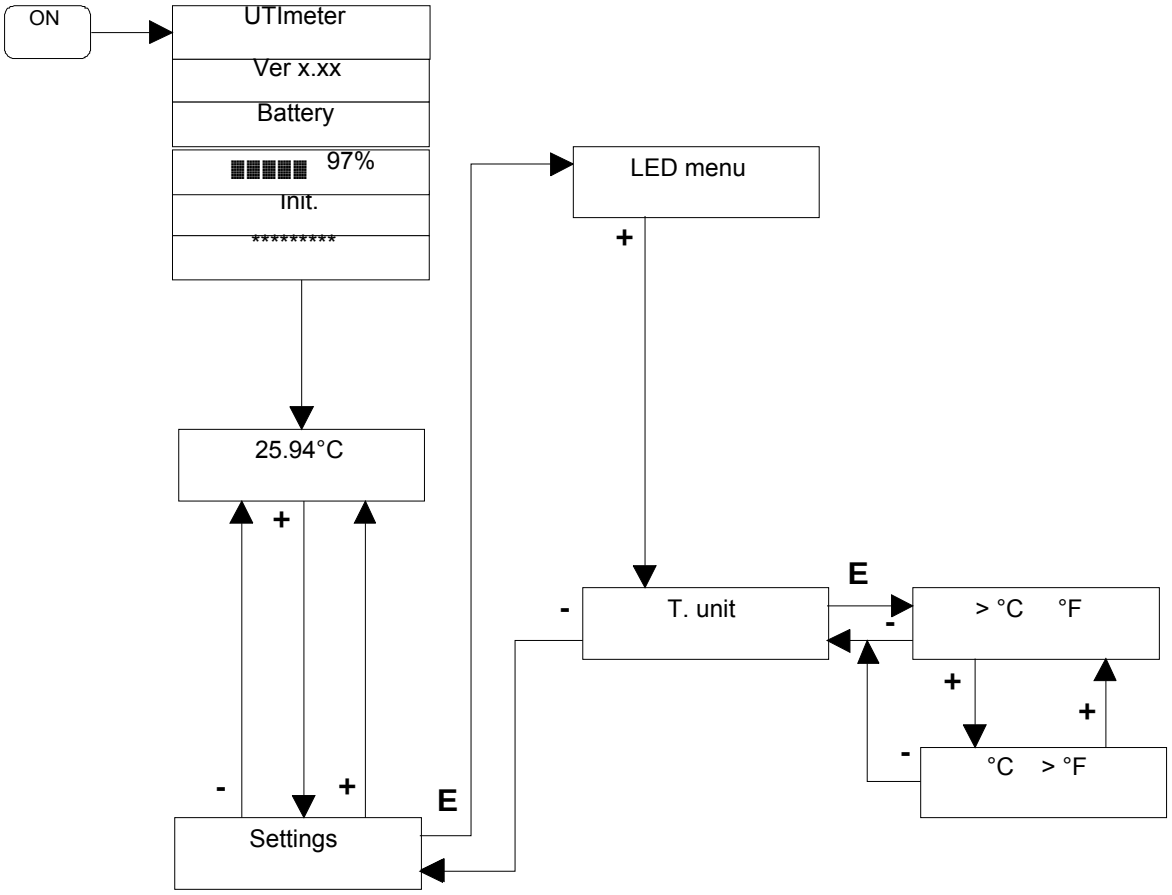


Figure 8-3

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter", "LED menu" is displayed,
- Press on "+"; "T. unit" is displayed,
- Press on "enter",
- Select the scale by pressing on "+" one or more times, the pointer shows the scale selected,
- Press "-" two times to come back in measurement mode.

The new setting is stored in the permanent memory.

8.4 Selecting the temperature resolution

The temperature reading can be given with 1 or 2 digits after the dot. Select the appropriate resolution as shown on Figure 8-4.

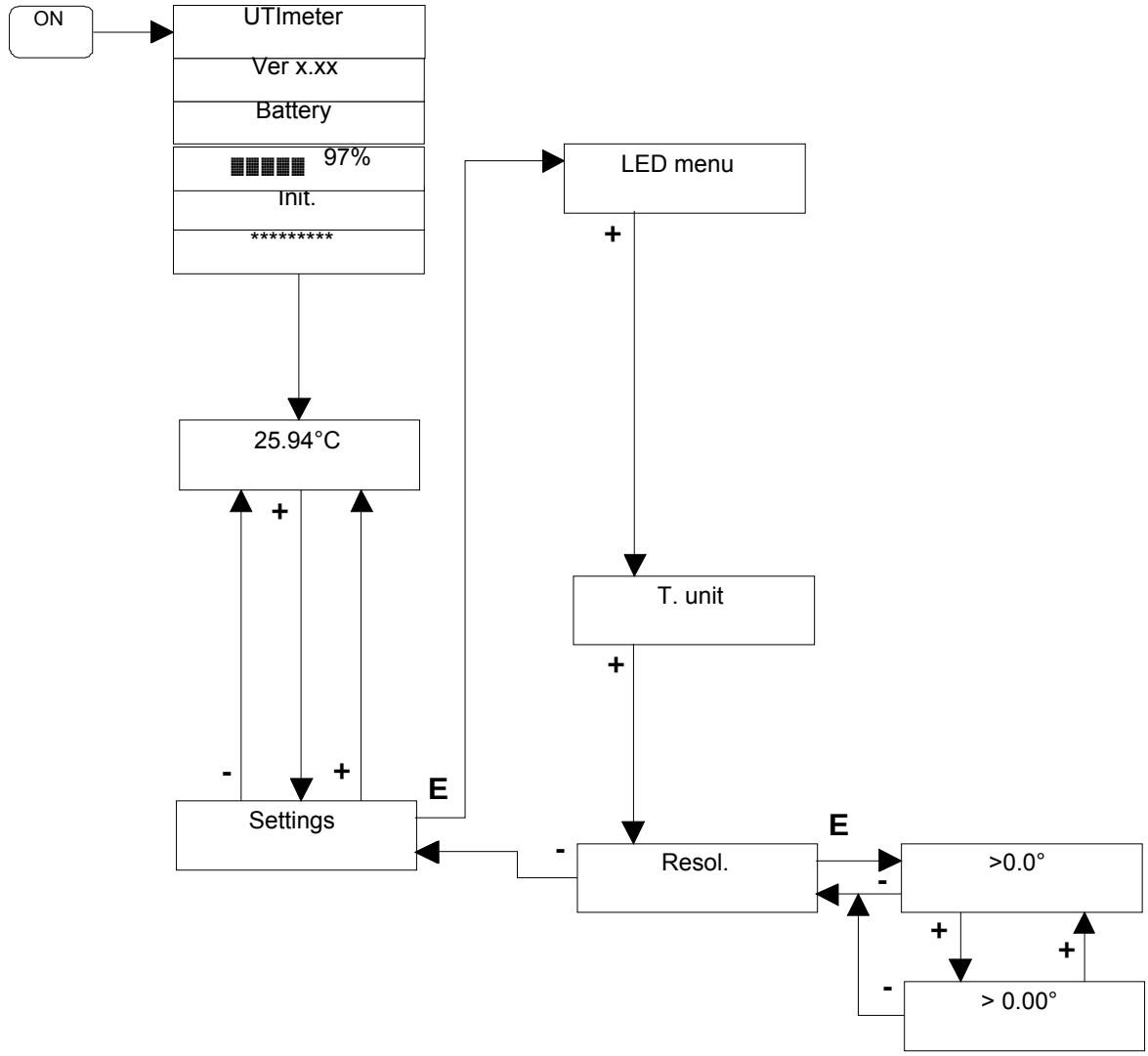


Figure 8-4

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter", "LED menu" is displayed,
- Press on "+"; "T. unit" is displayed,
- Press on "+", "Resol." is displayed,
- Press on "enter",
- Select the resolution by pressing on "+" one or more times, the pointer shows the resolution selected,
- Press "-" two times to come back in measurement mode.

The new setting is stored in the permanent memory.

8.5 *Activating the LED*

Refer to Figure 8-5.
The LED can be activated on 2 modes:
- one is temporary, it is automatically erased when the unit is switched off, in order to save the battery life;
- the other is permanent, it will stay even is the unit is switched off.

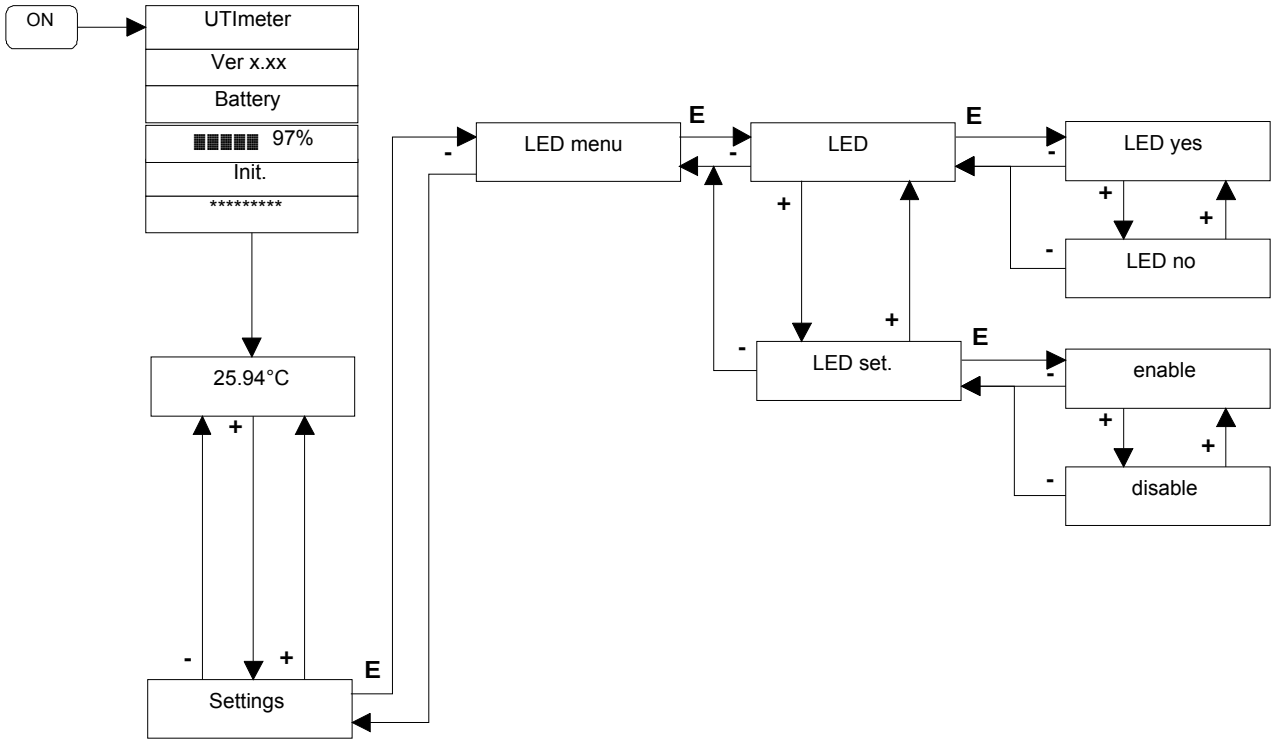


Figure 8-5

8.5.1 Temporary setting of the LED

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter"; "LED menu" is displayed,
- Press on "enter"; "LED" is displayed,
- Press on "enter", then select by pressing "+" the mode: "LED yes" or "LED no".
- Press "-" two times to come back in measurement mode.

It is always possible to change the status of the LED during gauging, by using the same menu again. If not done before, switching off the unit will automatically light off the LED.

8.5.2 Permanent setting of the LED

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter"; "LED menu" is displayed,
- Press on "enter"; "LED " is displayed,
- Press on "+", "LED Set." is displayed,
- Press on "enter",
- "Enable" or "disable" the LED by pressing on "+" one or more times,
- Press "-" two times to come back in measurement mode.

The new setting is stored in the permanent memory.
Remember that the LED needs an extra power and reduces the battery life accordingly.

8.6 Muting the buzzer

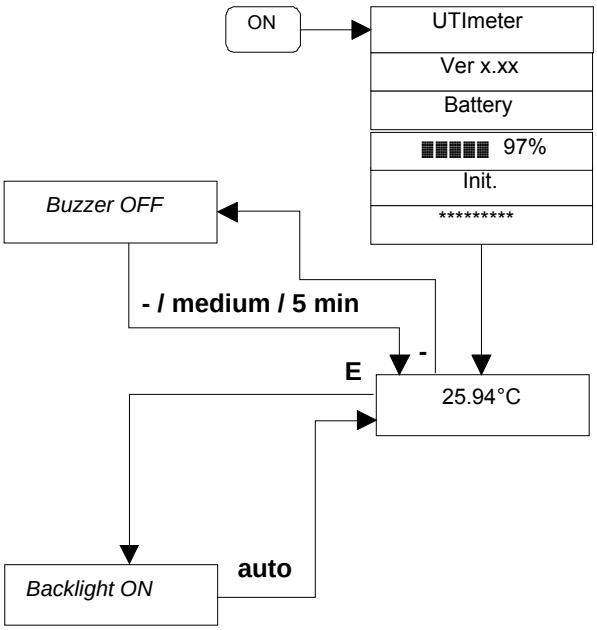


Figure 8-6

When in measurement mode it is possible to mute the buzzer.
- Press on "-",
- Press on "-" again to reset the buzzer.

IMPORTANT NOTE: in order to prevent any misuse of the equipment, there is an automatic reactivation of the buzzer each time the medium changes (air to liquid, liquid to water, etc.) or after 5 minutes muting. To keep the buzzer muting, press again on "-".

8.7 Backlight

Refer to Figure 8-6.
When in measurement mode press "enter": this switches on the backlight. After around 10 seconds, the light switches off automatically to save the battery life.

8.8 Checking the functions before using the instrument

Before installing the HERMetic instrument as described in section 8.9, the following tests are recommended to ensure that the instrument is ready to work.

8.8.1 Battery

Refer to section 9.2 "Checking the battery".

8.8.2 Temperature

Switch on the unit.
The buzzer shall beep every 2 sec.
When the temperature is displayed, check that it shows the surrounding temperature.

8.8.3 Ullage

Switch on the unit.
The buzzer shall beep every 2 sec.
Check the ullage in a glass of water.
Check the ullage by immersing the ultrasonic gap sensor but not the electrodes (position A); The buzzer shall beep continuously.

8.8.4 Interface

Switch on the unit.
The buzzer shall beep every 2 sec.
Check the interface in a glass of water.
Check the interface by immersing the interface electrodes also (position B). The buzzer shall beep intermittently.

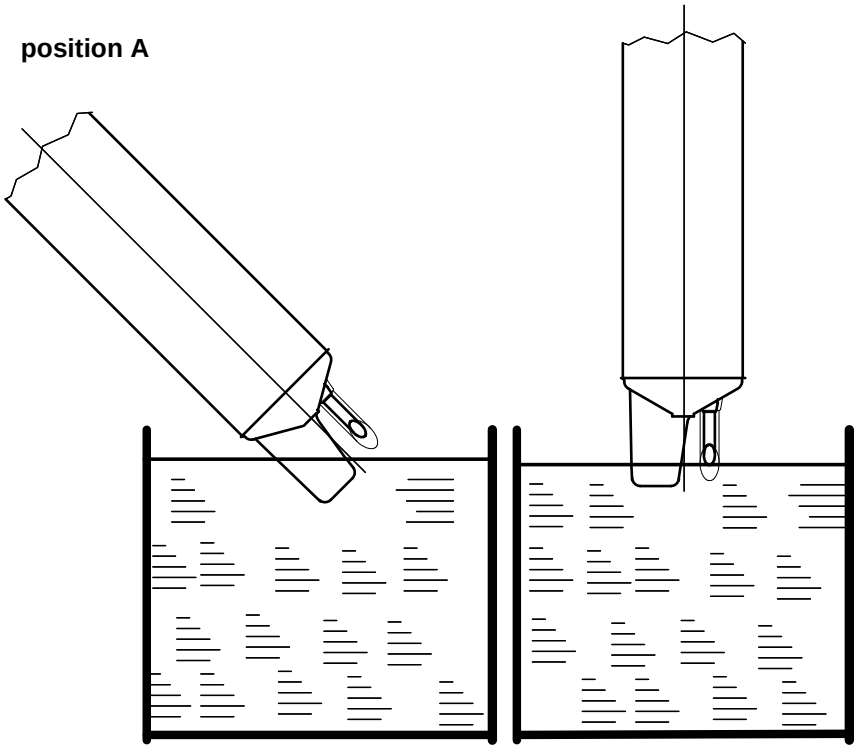


Figure 8-7

8.9 Installation of the instrument

- This HERMetic equipment must be coupled to a certified HERMetic valve.

- Before starting please read carefully the chapter “Recommendation for safe use” and follow your company's safety instructions.

- Check that the HERMetic valve is closed.

- Remove the end cap (weather cap / blind cover / security cover) of the HERMetic valve.

- Clean the seal surfaces of the nipple of the valve and of the coupler of the instrument from dust or grease.

Note: **Cleaning** of the mating surfaces is very important for **earth grounding** purpose and for good accuracy on **zero reference level**.

- Check whether the tape protection tube is moving freely.

- Install the HERMetic instrument on top of the valve by means of the quick coupler special adaptor. Ensure that the equipment is properly earthed. If not, ground it with the (optional) grounding cable before operating.

- **Attach the grounding clip to a metallic and conductive surface. Make sure that there is a good electrical contact.**

- **The HERMetic instrument shall be grounded until complete withdrawal of the probe from the tank and closure of the valve.**

8.10 Ullage/interface measurement

- Install the HERMetic equipment as per 8.9 "Installation of the instrument”.

- Open the valve by turning the handle.

- Switch on the equipment: a control beep is audible every 2 seconds.

- Put the tape cleaner on the "DOWN" position. Disengage the knob of the crank handle and lower the sensing probe into the tank by turning the reel. Make sure that the tape does not rub on any sharp edge when lowering as its insulation could be damaged.

- As soon as the sensor comes in contact with the petroleum product the control beep will change for a continuous beep. Raise the sensing probe again until the continuous beep stops and lower the sensing probe again slowly until the continuous beep is heard again. Now the ullage level can be read against the ullage reference. If the zero-ullage reference does not correspond to the reading index of the instrument, a correction has to be made accordingly.

- Lower the sensing probe further until the sensor touches the oil-water interface. As soon as the sensor comes in contact with water the continuous beep will change for an intermittent beep. The difference between the ullage reading and the interface reading represents the thickness of the product layer.

- When the measurements are completed, switch off the unit, turn the tape cleaner on "UP" position and wind up the tape until the sensing probe is in the storage tube. The reading on the tape shall be less than 420 mm or 1 ft 5 inch.

- Close the valve and disconnect the instrument from the nipple.

- Put the end cap back on the valve.

IMPORTANT NOTE

When activating the crank handle, always control through the window that the tape is really moving. If the tape does not move when the handle is activated, stop winding and identify its cause. Make sure the tape cleaner is in “DOWN” position. If the tape is still not moving despite correct position of the tape cleaner, please check if the sensor is stuck somewhere.

8.11 Reference height / innage measurement

If the unit is fitted with the additional load (model SS2 Q2, see Figure 8-8) then reference height / innage measurement are possible.

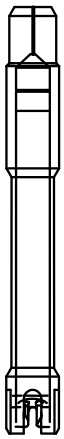


Figure 8-8

- Install the HERMetic equipment as per 8.9 "Installation of the instrument".

- Open the valve by turning the handle.

- Put the tape cleaner on the "DOWN" position. Disengage the knob of the crank handle and lower the sensing probe into the tank by turning the reel. Make sure that the tape does not rub on any sharp edge when lowering as its insulation could be damaged.

- When the sensing probe comes in contact with the dip/datum plate record the distance shown on the reading index. See Figure 8-9. The exact distance from the plate to the reading index is (reading + 4 mm / + 5/32") which is the reference height providing the reading index level has been adjusted to the zero ullage level of the tank. If the tank zero ullage is levelled above or below the reading index, an additional correction shall apply. For more details refer to section "Installation of the gauging system".

- Turn the tape cleaner on "UP" position.

- Switch on the unit and raise up the sensing probe until checking the oil/water interface if any (see details in section "**Error! Reference source not found.**"). To get a better accuracy of the interface level, release the tape cleaner on the "DOWN" position during the final checking. Calculate the free water height by subtracting the index reading to the reference height.

- Reengage the tape cleaner on the "UP" position and raise up the sensing probe until checking the ullage (see details in section "**Error! Reference source not found.**"). Release the tape cleaner for final checking of the ullage. Calculate the innage by subtracting the index reading and the free water height to the reference height determined before.

- When the measurements are completed, switch off the unit, engage the tape cleaner on the "UP" position and wind up the tape until the sensing probe is in the storage tube. The reading on the tape shall be less than 420 mm or 1 ft 5 inch.

- Close the valve and disconnect the instrument from the nipple.

- Put the end cap back on the valve.

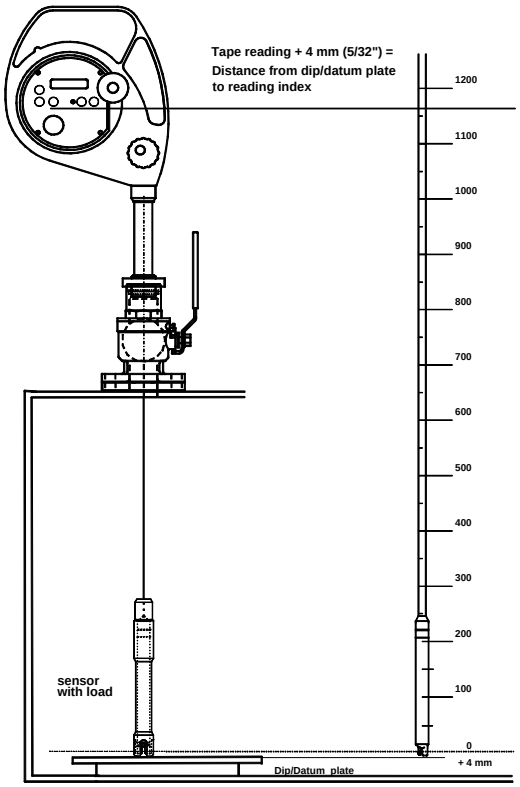


Figure 8-9

8.12 Temperature measurement

- Install the HERMetic equipment as per 8.9 "Installation of the instrument".

- Open the valve by turning the handle.

- Switch on the unit: a control beep is audible every 2 seconds.

- Put the tape cleaner on the "DOWN" position. Disengage the knob of the crank handle and lower the sensing probe to the **deepest** reading desired. Make sure that the tape does not rub on any sharp edge when lowering; its insulation might be damaged.

- The position of temperature sensor coincides with zero of tape, so the tape index reading shows directly level at which temperature is measured

- When the desired temperature ullage level is reached, joggle the sensing probe approximately 300 mm (1 foot) above and below the desired measurement level until the displayed temperature reading settles. For heavy crude oils which have a low thermal conductivity and a viscous nature, the joggling procedure is a necessity to assure an accurate temperature reading in a minimum amount of time.

- When temperature has settled, record it.

- Engage the tape cleaner on "UP" position. Raise the probe to the next ullage level to be measured and repeat the procedure a.m. To joggle the sensing probe the tape cleaner must be on the "DOWN" position.

- When the measurements are completed, switch off the unit, engage the tape cleaner on "UP" position and wind up the tape until the sensing probe is in the storage tube. The reading on the tape shall be less than 420 mm or 1 ft 5 inch.

- Close the valve and disconnect the instrument from the nipple.

- Put the end cap back on the valve.

IMPORTANT NOTE

As mentionned in 8.6 "Muting the buzzer" it is easy to mute the buzzer during the temperature measurement by pressing on "-".

Recall that after 5 minutes have elapsed or each time the probe detects a change of the medium (air, liquid, water), the buzzer will reactivate automatically. To keep it muting, press on "-" again.

9. Care and Maintenance

9.1 Care

Clean the instrument of any excess of liquid after use.

Make sure that the sensing probe is completely stored in the storage tube after use (reading index shall indicate less than 420 mm or 1 ft 5 ").

Check the tightness of the reading index screws and if necessary adjust the level, refer to section 9.9.

Store the instrument in a dry location.
Check periodically (at least every 6 months) the continuity of grounding by measuring the electrical resistance between the tape adaptor (or the sensing probe tube) and the quick connect coupler. Resistance should not exceed 10 Ω.

Periodically clean carefully the sensor probe, the frame and the mechanical parts, as storage tube, tape, with an appropriate solvent.

Note: always reassemble the storage tube to the frame in the vertical position to allow the O-ring to seat properly in the tube.

Check periodically the condition of the tape cleaner.

With such conductive liquids which form salts when drying, wash the sensing probe with water or alcohol and brush it very gently with a soft brush to prevent a water detection error due to a short-circuit between the electrode and the tube.

9.2 Checking the battery

Please note that in case you have to change the battery, it must be done only in a safe area.
Refer to section 9.3 "Battery replacement".

9.2.1 Before starting gauging

Switch on the unit. The buzzer tones every 2 seconds if the battery is not too low.

The following sequences are displayed as per Figure 9-1, the 4th sequence shows the remaining power of the battery in percentage and as a bar-graph.

If the power left is less than 50% we recommend to have a spare battery ready for exchange. See also 9.3 "Battery replacement".

If the power left is less than 20% the message is blinking to advise that the power may not be enough to carry out all the work.

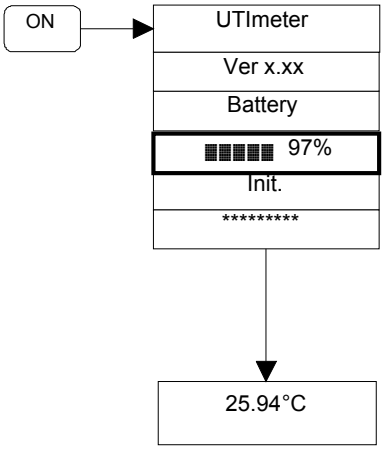


Figure 9-1

If the battery is too low, the unit will stop on the message "battery" as shown on Figure 9-2 and the buzzer tones continuously. Change the battery as per 9.3 "Battery replacement".

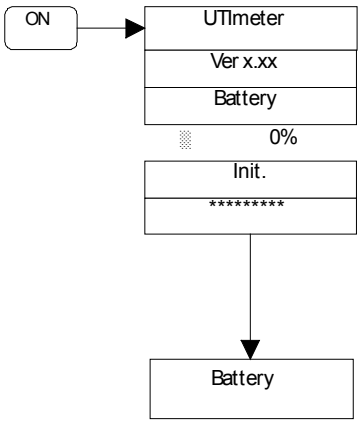


Figure 9-2

If it is not possible to switch on the unit, the battery is out or work. Change the battery first, as per **9.3 "**Battery replacement**".**

9.2.2 During gauging

When the unit is already switched on and working, it is always possible to see what power is left with the battery by entering the settings menu:

- Press on "+" to enter the settings menu,
- Press on "enter", "LED menu" is displayed,
- Press on "+"; "T. unit" is displayed,
- Press on "+", "Resol." is displayed,
- Press on "+", "Language" is displayed,
- Press on "+", "Battery" is displayed,
- Press on "enter",
- The remaining battery power is displayed in percentage and as a bar-graph; pressing "+" again allows to see the tension of the battery (B); the last information (A) is internal.
- Press "-" two times to come back in measurement mode.

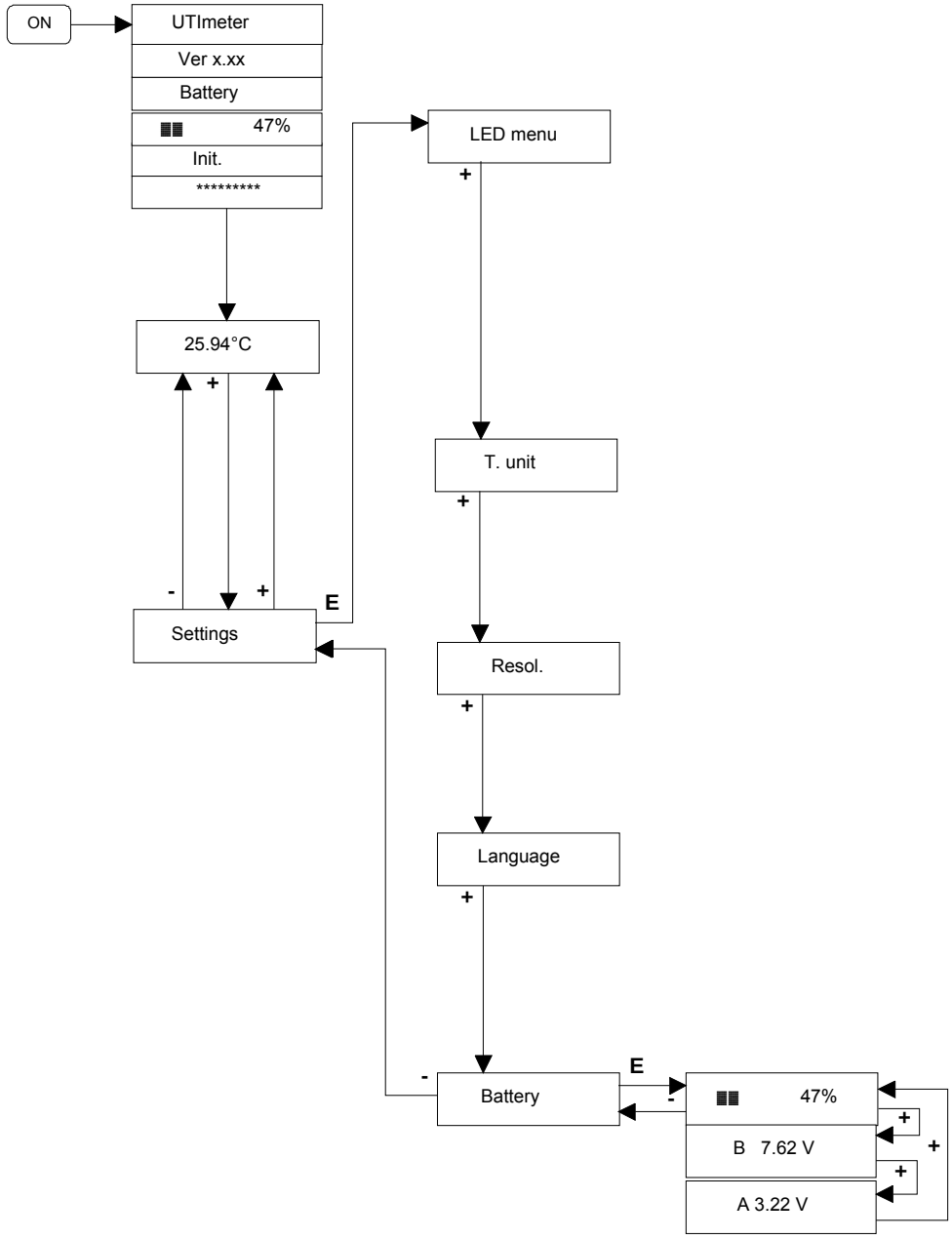


Figure 9-3

9.3 Battery replacement

Warning : change the battery only in a non hazardous area.

- Unscrew the 2 screws of the battery holder using the 2,5 mm Hex Allen key which is located on the carrying case. See Figure 9-4.
- Pull it gently out.
- Change the battery (one-way only device). See Figure 9-4.
- Push the battery holder back in its housing (one-way only).
- Tighten the 2 screws.

Only one battery is approved:

Duracell / Procell MN1604

Caution: Do not throw batteries in rubbish; deposit them in a recycling bin.

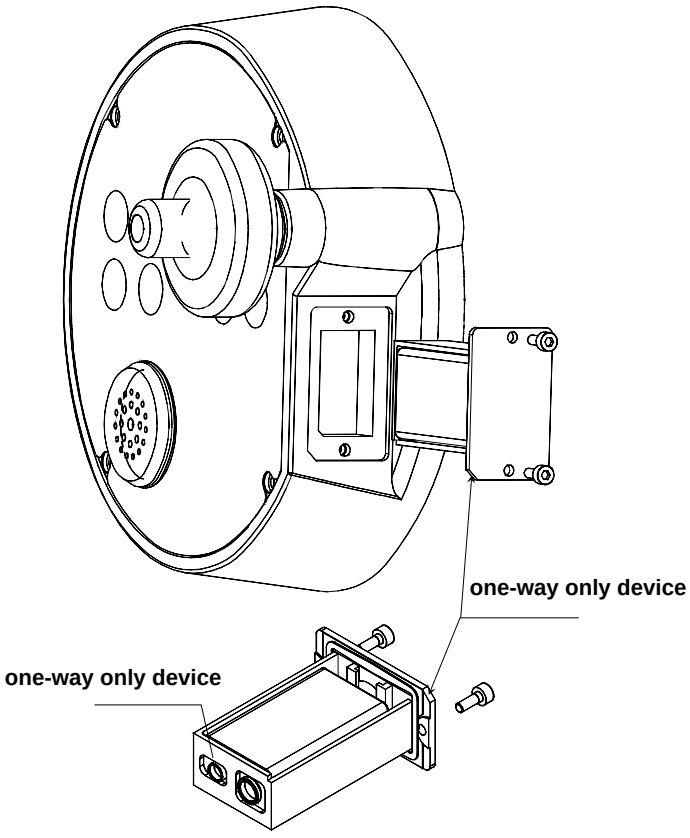


Figure 9-4

9.4 Tape replacement

THE REPLACEMENT OF THE TAPE DOES NOT REQUIRE TO RE-CALIBRATE THE TEMPERATURE.
Follow the different sequences as described below. The Figure 12-1 : general assembly, list of the main spare parts can also help.

9.4.1 Disconnecting the tape from the sensor

Follow the instructions of section 9.5 "Sensing probe replacement".

9.4.2 Disconnecting the tape from the electronic box

- Unscrew with the 2.5 Allen key the 2 screws (A) of the battery holder and pull it out as shown on Figure 9-5.
- Unscrew with the 2.5 Allen key the 4 screws (B) of the display unit and pull it gently out as shown on Figure 9-5.

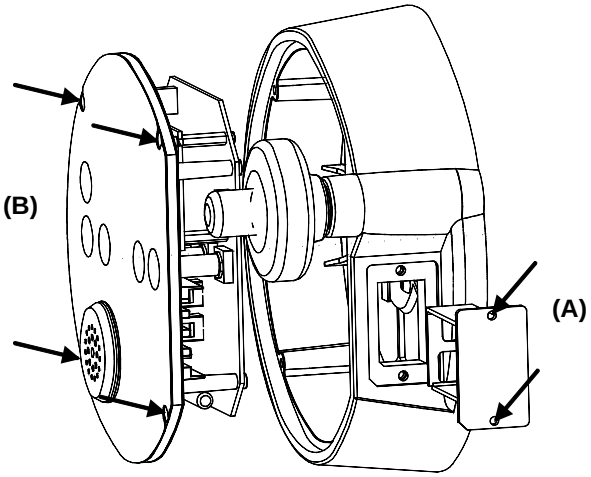


Figure 9-5

- Disconnect the connecting plug (C) as shown on Figure 9-6 and remove the display unit.
- Unscrew with the 2.5 Allen key the tape holder (G) by removing the 2 screws (F) and the grounding cable (D) as shown on Figure 9-6. Do not loose the 2 remaining screws that secure the reel axle.

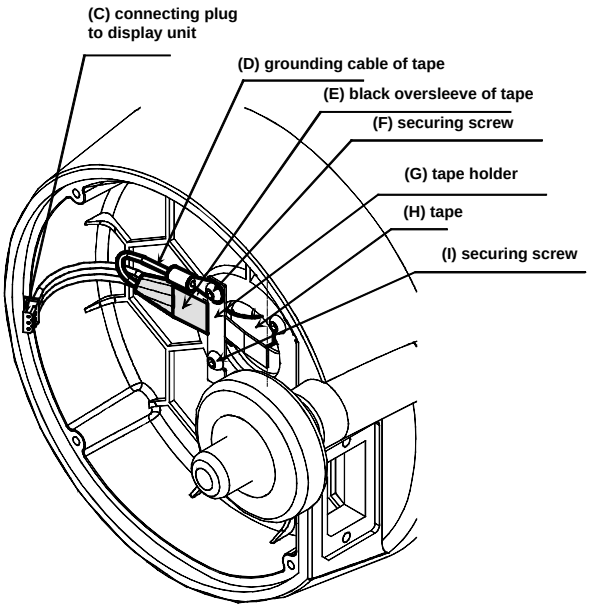


Figure 9-6

9.4.3 Disconnecting the tape from the reel axle

- Remove the external reel flange (3 screws to unscrew with the 2.5 Allen key).
- Remove the axle cover (3 screws to unscrew with the 2.5 Allen key).
- Unscrew with the 2.5 Allen key the 4 screws (K) of the washer holder, as shown on Figure 9-7.
- Remove the tape from the reel axle.

9.4.4 Removing the tape from the frame

- Remove the tape protection tube from the tape.
- Turn the tape cleaner in position "DOWN" to free the tape.
- Pull the tape gently out of the tape cleaner.
- Pull the tape adaptor end out of the housing, through the storage tube.
- Slacken the tape a few turns from the reel axle.
- Remove the tape from the housing.

9.4.5 Mounting the new tape

- Install the new tape on the reel axle.
- Leave approximatively 20 cm of tape free at the core.
- Make a loop (M) and a S-shape (L) with the tape as shown on Figure 9-7.
- Pass the tape end through the axle core.
- Secure the gaskets and the washers mounted on the tape in the axle core with the washer holder and its 4 screws (K) as shown on Figure 9-7.
- On the electronic box side, adjust the black oversleeve just to the edge of the tape holder (pull the tape gently from the other side) and tighten the tape end as shown on Figure 9-6 with.
- Follow in the reverse order the instructions of sub-section 9.4.2 to re-install the electronic box.
- If necessary, readjust the loop (M) and the S-shape (L) of the tape at the core of the reel axle.
- Follow the instructions of sub-section 9.4.4 in the reverse order to pass the tape through the tape cleaner, the storage tube and to mount the tape protection tube on.
- Put back the reel flange and its 3 securing screws.
- Follow the instructions of section 9.5 "Sensing probe replacement" to re-install the sensor on the tape.
- Carry out the functional tests as per 8.8 "Checking the functions before using the instrument".
- If there is any problem, refer to section 10 "Trouble shooting".

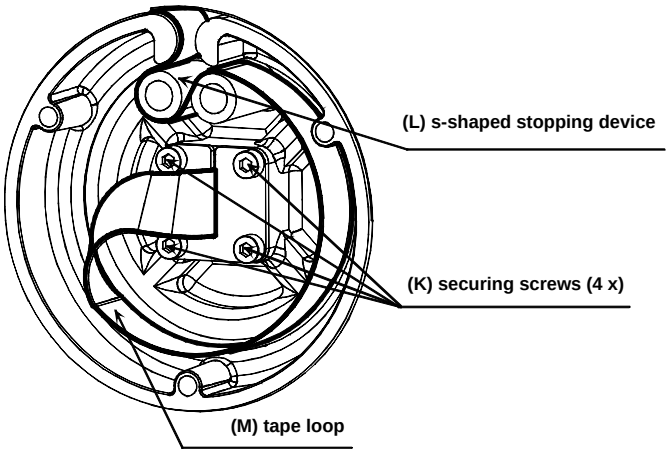


Figure 9-7

9.5 Sensing probe replacement

THE REPLACEMENT OF THE SENSING PROBE DOES NOT REQUIRE TO RE-CALIBRATE THE TEMPERATURE NOR THE ULLAGE / INTERFACE.

9.5.1 Disconnecting the old sensing probe

- Unscrew the securing screw with the 1.5 mm Hex Allen key.
- Pull carefully the adaptor out of the sensing probe tube by turning it slightly left and right. Make sure that the O-ring is not damaged when it passes the hole of the sensing probe tube.
- Disconnect the plug by pulling it gently out of the tube.

9.5.2 Connecting the new sensing probe

- Refer to Figure 9-8.
- Insert the 1.5 Allen key gently in the free hole in the middle of the tape plug.
- With one hand keep the sensing probe and the tape adaptor as shown on Figure 9-8.
- With the other hand drive the plug into the new sensor tube with the 1.5 Allen key to connect it to the sensing probe socket. Note this is a one way only plug. The wires shall be on the opposite side of the electronic circuit print as shown on Figure 9-8.
- Pull out gently the 1.5 Allen key from the plug while keeping the plug in place with another non sharp tool, for instance the 4 mm Allen key. Check that the plug is fully inserted.
- Switch on the unit and wait a few seconds. If all is OK, the temperature is displayed and the buzzer beeps every 2 seconds. If there is any problem, refer to the section 10 "Trouble shooting".
- Put some light grease on the O-ring.
- Push gently the adaptor into the sensing probe tube. Mind not to damage the O-ring when it passes the screw hole.
- Screw the securing screw back with the 1.5 mm Hex Allen key.

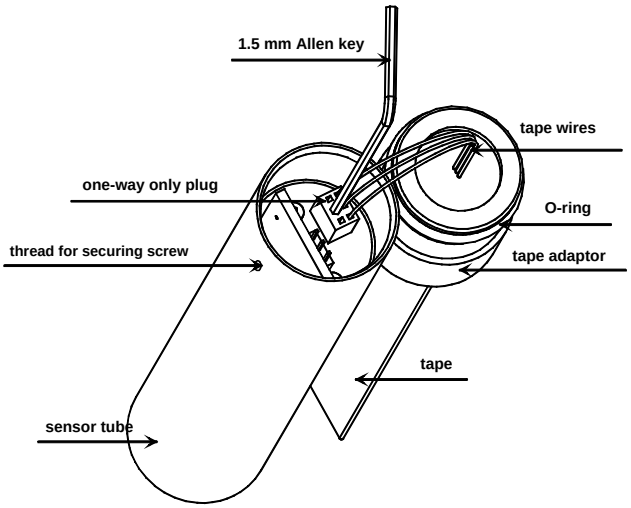


Figure 9-8

9.6 Tape wipers replacement

The 2 tape wipers can be easily replaced:

- Check that the tape cleaner is on "DOWN" position.
- Pull the tape cover out of the frame. Use pliers to help the clips to get out of the frame.
- The tape wipers are inserted in holders grooves. Remove the old ones and insert the new ones.
- Push the tape cover back into the frame.
- Check that the tape cleaner is working properly.

Note: we recommend to change always both wipers.

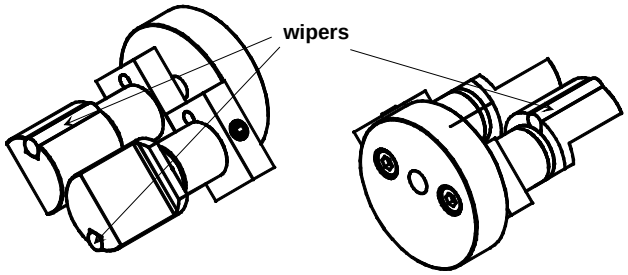


Figure 9-9

9.7 Display unit replacement

THE REPLACEMENT OF THE DISPLAY UNIT DOES NOT REQUIRE TO RE-CALIBRATE THE TEMPERATURE.

9.7.1 Disconnecting the old display unit

- Unscrew with the 2.5 Allen key the 2 screws (A) of the battery holder and pull it out as shown on Figure 9-10.
- Unscrew with the 2.5 Allen key the 4 screws (B) of the display unit and pull it gently out of the electronic box, as shown on Figure 9-10.
- Disconnect the tape plug, item (C) shown on Figure 9-6.

9.7.2 Connecting the new display unit

- Connect the tape plug to the new display unit.
- Put back the new display unit in the electronic box; tighten the 4 screws (B) of Figure 9-10.
- Reinstall the battery holder with the 2 screws (A) of Figure 9-10. Refer to Figure 9-4 page 34.
- Check that the unit is working properly, as described in 8.8.

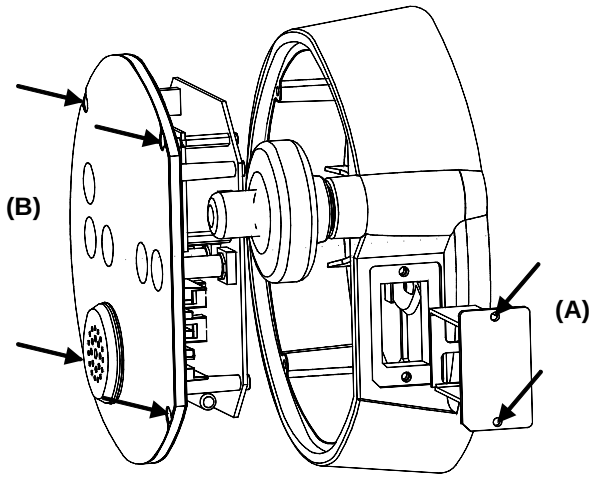


Figure 9-10

9.8 Verification and certification of tapes

The tape has to be periodically inspected for breaks, kinks, wear and illegible numbers.
As the tape is a cable it might be necessary to check its electrical conformity. Refer to section 10.8. It is necessary also to check it for accuracy regularly according to current National or International Standards, as API "Manual of Petroleum - Measurement Standards - Chapter 3 - Tank Gauging - Section 1A - Standard practice for the manual gauging of petroleum products in stationary tanks" or IP "Petroleum Measurement Manual - Part III - Manual Tank Gauging - Section 1 - Non-Electrical Methods" or relevant ISO standards.
In such a case it is important to remember that the bottom of the sensing probe is 4 mm lower than the zero of the tape, thus to assure that the electrical zero coincide with the tape zero.
It is also important to remember that the nominal tension at which the tape was produced is marked on each beginning of tape and is normally 6 N (1,3 lb). If tensioned at 44,5 N (10 lb) as per API this will result in a additional elongation up to 3.7 mm over 30 meters.
This periodical verification can be done at the factory or in a Service Station.

9.9 Verification and adjustment of the reading index

To verify or to adjust the reading index, in particular after
following instru
- if the equi
(Q2) remo
on Figure
- put the tap
- keep the
flat surface
- gently low
the surface
- adjust the
the connec
9-11;
- In case of
clip and th

IMPORTANT NOTE: these adjusting values for the heights installation of account the the sensor ters.

UNFORTUNATELY THE TKT DESIGN / TUBES ARE NOT COMPATIBLE WITH THE CONCEPT OF VERIFICATION AND ADJUSTMENT OF THE READING INDEX DESCRIBED IN THIS SECTION.

THEREFORE PLEASE SEND YOUR EQUIPMENT TO ONE OF OUR OFFICIAL SERVICE STATIONS FOR THIS ADJUSTMENT.

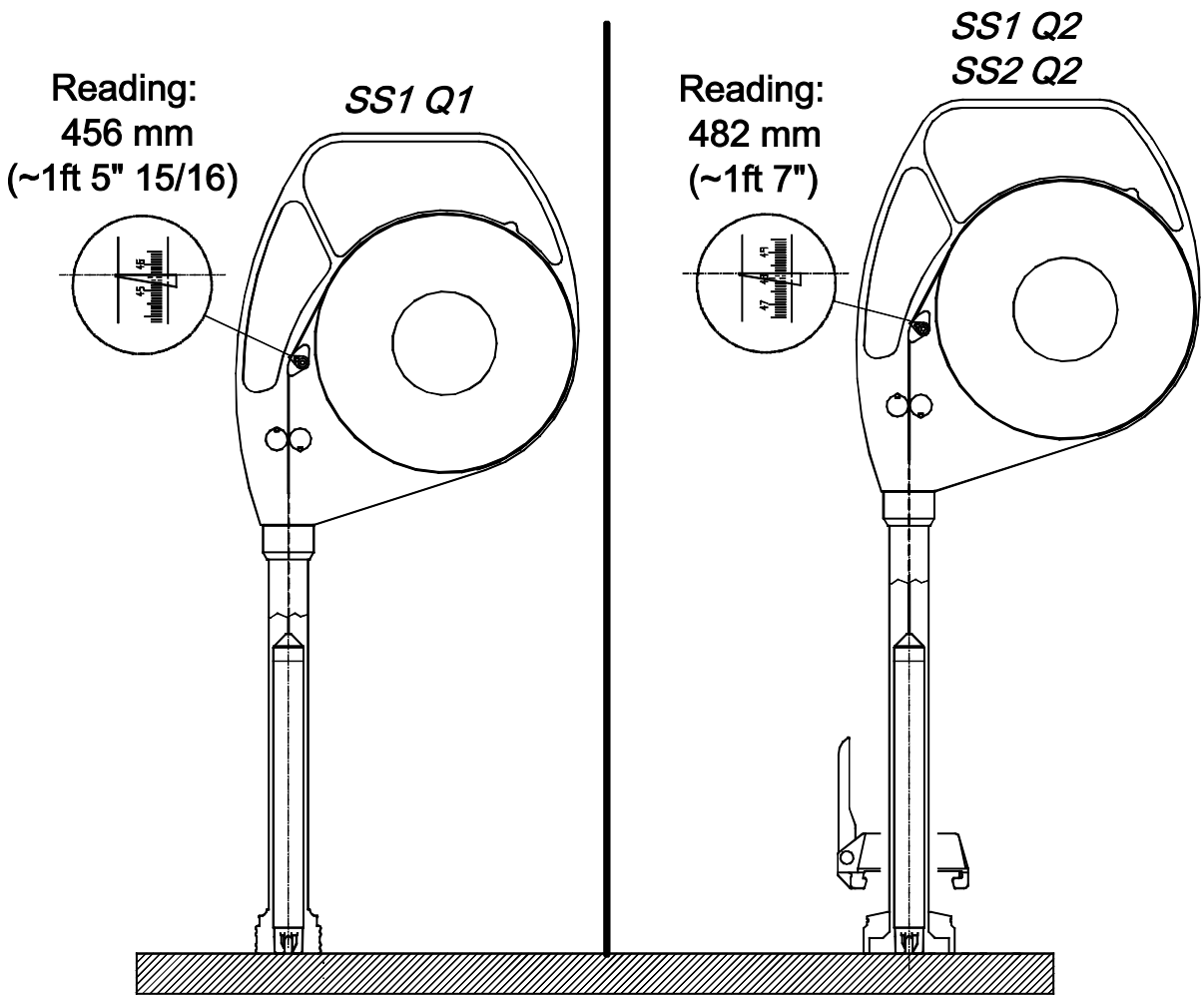


Figure 9-11

9.10 Temperature verification

The temperature calibration curve is stored in the sensor memory and cannot be modified. The calibration is set once at the factory and do not require subsequent adjustment.
Nevertheless it is recommended to check the temperature accuracy once a year. A one point check is enough to qualify the sensor.

9.10.1 Equipment required

- A Dewar flask or any vacuum flask, approximately 8 cm in diameter and 36 cm deep.
- Ice, preferably made from distilled water.
- Water, preferably distilled and precooled.

9.10.2 Preparing the Ice Point bath

(1) Shave or crush the ice into small pieces, avoiding direct contact with the hands or any unclean object. The pieces shall be no more then 5 mm.
(2) Fill the Dewar flask with the crushed ice and add sufficient water to form a slush, just filling the voids between ice particles but not enough to float the ice.
(3) Insert the sensor, packing the ice gently about it.
(4) Let it stand for half an hour to permit the sensor temperature, the ice particles and the water to equilibrate.
(5) As the ice melts it will be necessary to drain off some water and add more crushed ice. Gently stir the ice with the sensor periodically to assist equilibration.

IMPORTANT NOTE: Attention to detail during the preparation of the Ice Point bath is critical to the accuracy and quality of the offset verification.

9.10.3 Checking the UTImeter

(6) After 30 minutes have elapsed, gently stir the bath with the sensor again to ensure complete equilibration of temperature.
(7) Switch on the UTImeter.
(8) Observe the reading. It should be ±0.10 °C (±0.20 °F) The temperature must be stable, i.e. within ± 0.04 °C (± 0.07 °F).
(9) If it is not OK, refer to section 10 "Trouble shooting".

9.11 Ullage/Interface verification

The sensitivity of the instrument in ullage / interface cannot be adjusted. Both ullage and interface levels are set at the factory.

Checking ullage and interface level detection

The test liquid should be the one to be gauged. Fill in a container with appropriate liquid.

Switch on the unit. The buzzer shall beep every 2 sec.

If the liquid is conductive (alcohol, water, ...)

- Check the **ullage** by immersing the ultrasonic gap sensor but not the electrodes (position A); The buzzer shall beep continuously.
- Check the **interface** by immersing the interface electrodes (position B). The buzzer shall beep intermittently.

If the liquid is non conductive (gasoline, oil, ...)

- Check the **ullage** by immersing the sensor (position B); The buzzer shall beep continuously.

- Check the interface by immersing the sensor (position B) in water. The buzzer shall beep intermittently.

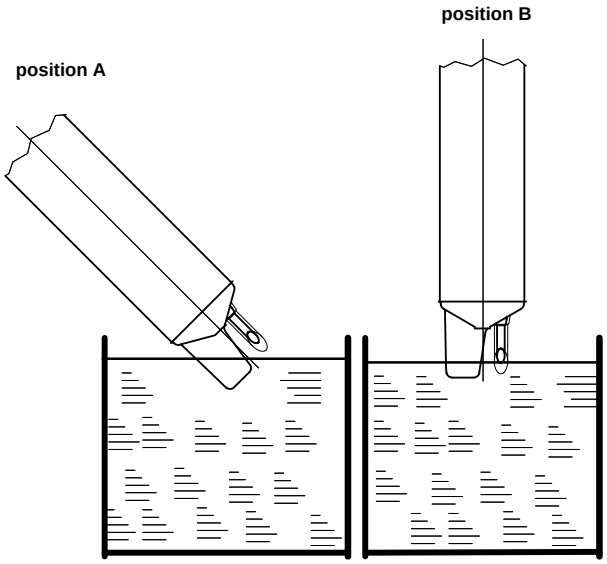


Figure 9-12

10. Trouble shooting

10.1 Safety warning

As this equipment is designed and approved for use in an explosive area (intrinsic safe equipment), only authorized service stations and the factory are allowed to repair electronic circuits.

However the customer can exchange parts and modules if the following points are observed :

1. Never open the instrument nor carry out any repair or trouble shooting in an hazardous area.

2. Use only original spare parts.

3. Work shall be done only by maintenance personnel who has an experience with intrinsically safe equipment.

The design of the equipment is modular, i.e. in case of breakdown the customer can find out which modules have to be replaced. The instrument consists of the following modules:

- Mechanical parts
- Sensing probe
- Tape assembly
- Display unit / electronic box
- Tape cleaner

The following sections should allow to identify the defective module and to replace it.

10.2 Power supply troubles

Symptom	Origin	Action	Section
The unit does not switch on	Battery too low	Change the battery	9.3
	Corrosion of terminals (battery side)	Clean the battery terminals	---
	Corrosion of terminals (display unit side)	Clean the display unit terminals	---
	Switch defective	Change the display unit	9.7
The unit switches on but stops on the message "battery"; the buzzer tones continuously	Battery too low	Change the battery	9.3

10.3 Transmission troubles

Symptom	Origin	Action	Section
"No Msg " is displayed	Sensor out of work or	Renew the sensor	9.5
	Tape out of work	Renew the tape	9.4
"Invalid" is displayed	Sensor out of work	Renew the sensor	9.5
"Unknown" is displayed	Sensor out of work	Renew the sensor	9.5

10.4 Ullage and/or Interface troubles

Symptom	Origin	Action	Section
The buzzer does not beep when the unit is switched on	Buzzer switched off or	Press on "-" to reactivate it	8.6
	Key-pad defective or	Pressing on "+" has no action Change the display unit	9.7
	Buzzer defective	Press on "+": "Settings" is displayed Change the display unit	9.7
The buzzer tones continuously when the sensing probe is in air or liquid or water	Battery too low	Change the battery	9.3
The buzzer gives the water signal whatever liquid is gauged	Sensing head contaminated by conductive residues	Wash, clean and brush (soft brush) the sensing head or change the sensor	--- 9.5
The buzzer gives the oil signal in water	Sensing head contaminated by non conductive residues	Wash, clean and brush (soft brush) the sensing head or change the sensor	--- 9.5

10.5 Temperature troubles

Symptom	Origin	Action	Section
"> 90°C" or "> 194°F"is displayed	Temperature to high	The temperature range shall be < 90°C / 194 °F	---
"< -40°C" or "< -40°F" is displayed	Temperature too low	The temperature range shall be > -40 °C/F	---
Temperature does not stabilise	Heated viscous liquid (such as heavy crude oils)	Check the stability in cold and hot water; if it is OK the problem is with the gauged liquid and not with the probe	---
	Contaminated sensing probe	Clean the temperature electrode; remove any residues or sludge; check the stability in cold and hot water	---

10.6 Visual inspection for damaged or missing parts

General condition: missing parts
Display unit: 5-key control pad, buzzer, front face, LED, screen
Sensing probe: sensors broken, smashed or damaged
Tape: check at least the first 3 m; wires still insulated, no breaks, no kinks, ...
Mechanical parts: check frame, axle, storage tube, wipers of tape cleaner, window wiper

10.7 Coated aluminium parts

PA 11: Rilsan = blue, grey or yellow colour
The coating should be subject to regular and careful inspection. The continued used of the apparatus should not be permitted if inspection reveals that the protective material has become damaged to the extend that the underlying protected metal is visible, until such damage has been satisfactorily repaired.

10.8 Electrical checking of the tape assembly

⇒ **Test for grounding**

- Remove the battery holder as described in section 9.3.

⇒ Measure the resistance between the ground (-) terminal (as shown on Figure 10-1) of the electronic circuit and the tube of the sensing probe; the resistance should be less than 10 Ω. If it is higher, the steel tape might be broken or the connection between the sensing probe circuit and the sensing probe tube might be interrupted.

⇒ **Test for short-circuit**

- Disconnect the tape at both ends: display unit side and sensing probe side (see sections 9.4.1 and 9.4.2).
- Measure the resistance between each conductor red-white, red-black, white-black. This resistance should be infinite as an open circuit. If not, the tape might be defective.

⇒ **Test for open-circuit (continuity)**

- Disconnect the tape at the sensing probe side see 9.4.1).
- Measure the resistance of each conductor of the tape (between red and red, white and white, etc.).
- The resistance should be less than 15 Ω. If not, the tape might be broken. To replace the tape see section 9.4.

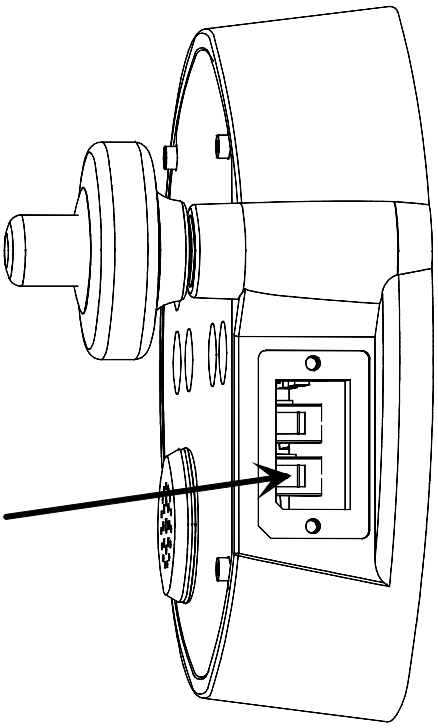


Figure 10-1

11. Specifications

General Specifications

Accuracy of ullage-interface detection	±2 mm (± 0.08” approx.)
Ullage, interface indication	Audible or visible
Tape length	15 m/50 ft, 30 m/100 ft, 35 m/115 ft
Tape graduation	Metric/English
Tape resolution	1 mm / 1/16”
Tape accuracy	±1.5 mm/30 m (±1/16”/100 ft approx.)
Meets ISO 4512 and API MPMS Chap 3.1A requirements	
Diameter of probe (without load)	23 mm (29/32” approx.)
Minimum detectable tank bottom liquid level	4 mm (5/32” approx.)
Accuracy	±0.1°C (0°C to 70°C); ±0.2°F (32°F to 158°F)
meets ISO 4268, API MPMS Chap 7 and IP PMM Part IV requirements	
Ambient temperature range	-20°C to 50 °C (-4°F to 122°F)
Temperature sensor measurement range	-40°C to 90°C (-40°F to to 194°F)
Temperature measurement resolution	0.01° or 0.1°, selectable
Temperature reading	°C or °F, selectable
LCD Display	8 characters
Mechanical coupling	TKT adaptor

Hazardous environments approvals

IECEx	Zone 0 Ex ia IIB T4 20°C < Ta < +50°C
ATEX	II 1 G EEx ia IIB T4 / Tamb 50°C
Factory Mutual (FM Approvals)	CL I, DIV 1, GP C&D, T4 Tamb 50°C and CL I, ZN 0, AEx ia IIB T4 Tamb 50°C

Multifunctions-Sensor

Ullage detection	ultrasonic
Interface detection	conductivity
Temperature	Platinium RTD Pt 1000
Innage / Reference height	additional load (option)
Tape cleaning device	UP / DOWN tape cleaner
~~**Tape protection tube**~~	~~on all units equipped with TS storage tubes~~
Maintenance	modular design / easy exchange of parts

Specifications subject to change without notice.

12. Spare parts

12.1 How to proceed

Each spare part is identified by the letters TS followed by a 5 digits number, as for instance TS 12207 for the sensor or TS 10192 for the 30 meters tape.

Proceed as follows to identify the part you need to order:
1) Find the adequate drawing on the next pages;
2) Note the item TS number, ex. TS 10207;
3) With the assistance of the below table, identify its description, ex. "Sensor Ultra".

For each order, please note the item number, its description and the required quantity.
Example: TS 10207 "Sensor Ultra", 3 x.

12.2 List of parts descriptions

TS number	Description	Notes
10182	Storage tube S2-Q2 with load	
10183	Storage tube S1-Q2	
10184	Storage tube 1" S1-Q1	
10189	Battery holder assy	does not include TS 40300 & TS 37020
10190	Electronic box assy	does not include TS 11210 & TS 40765
10191	Tape 15m stand. double assy	kit (tape + 1 x TS 11603 + 1 x TS 40853)
10192	Tape 30m stand. double assy	kit (tape + 1 x TS 11603 + 1 x TS 40853)
10193	Tape 35m stand. double assy	kit (tape + 1 x TS 11603 + 1 x TS 40853)
10207	Sensor Ultra	
10210	Display unit assy	
11025	Nut for load 700gr	
11026	Load 700gr	
11082	Security tube assy	
11129	Ball Inox Ø5.556 (7/32")10x	
11130	Compression spring	
11131	Clip	
11132	O-Ring Ø29.7x3.5	
11169	Heat shrink tube 24/8 x 80	
11189	Quick coupler lock	
11207	Axle bearing	
11208	Bearing for tape cleaner	
11209	Belt	
11210	Tape holder	
11211	Electronic box	
11213	Button handle	
11214	Connecting lever	
11215	Tape cover	
11216	Spacer	
11217	Gasket for electronic unit	
11218	Finger for handle	

11221	Index	
11222	Collar for connector 2"	
11223	Knob	
11226	Index block	
11227	Washer holder	
11228	Screw cup	
11235	Plate for battery holder	
11240	Wiper holder	
11246	Spring for battery holder	
11248	Gasket for battery holder	
11249	Battery holder	
11252	O-Ring Ø26.7 x 1.78	
11254	Storage tube 1" - Q1	without gaskets
11255	Storage tube 1" - Q2	without gaskets
11257	Reel axle assy	
11259	External part of knob	
11260	Knob for handle	
11263	Front face assy	without gasket
11267	External reel flange	
11268	Frame Rtex	
11600	O-Ring Ø31x2	
11603	O-Ring Ø15x3	
12047	Lever	
12086	Gasket for electronic box	
12107	Wiper Viton	
14093	Spring	
20541	O-Ring Ø56.74x3.53	
20549	Clip	
35069	LCD 1x8 alphanum assy	
37004	Buzzer SC 235 B	
37020	Bat 9v alka mang Procell MN 1604	
37314	Push Button Distancer	
37340	PCB Display UTImeter Tested Assy	
37354	Hard Paper Washer 2.2mm	
40220	Dowel pin 3x35	
40300	Socket head cap screw M3x8	
40303	Socket head cap screw M4x12	
40306	Socket head cap screw M3x10	
40316	Socket head cap screw M3x6	
40555	Spacer M-M M3x6/M3x8	
40611	Slotted flat head mach. screw M5x16	
40621	Flat head socket screw M5x12	
40765	Socket button head cap screw M4x10	
40775	Cover cap S6	
40853	Socket set screw M3x3	
40857	Socket set screw M4x6	
40859	Socket set screw M4x4	
40906	Crescent ring Ø17 Benzing	

12.3 Spare parts drawings & Declaration of Conformity

The next pages show the following documents:

- Figure 12-1 : general assembly, list of the main spare parts
- Figure 12-2: display unit assembly TS 10210, details
- Figure 12-3: battery holder assembly TS 10189, details
- Figure 12-4: electronic box assembly TS 10190, details
- Figure 12-5: load, details
- Figure 12-6: tape cleaner, details
- ND 30777 / TS 98165 Storage tube TKT assy, Valve TVC-02 of TKT 480mm
- ND 41306 / TS 98170 Storage tube TKT assy, Valve TVC-02 of TKT 320mm
- ND 30921 / TS 98185 Storage tube TKT assy, Valves TVC-02 of TKT 585mm
- ND 30779 FM UTImeter control drawing
- Declaration of Conformity

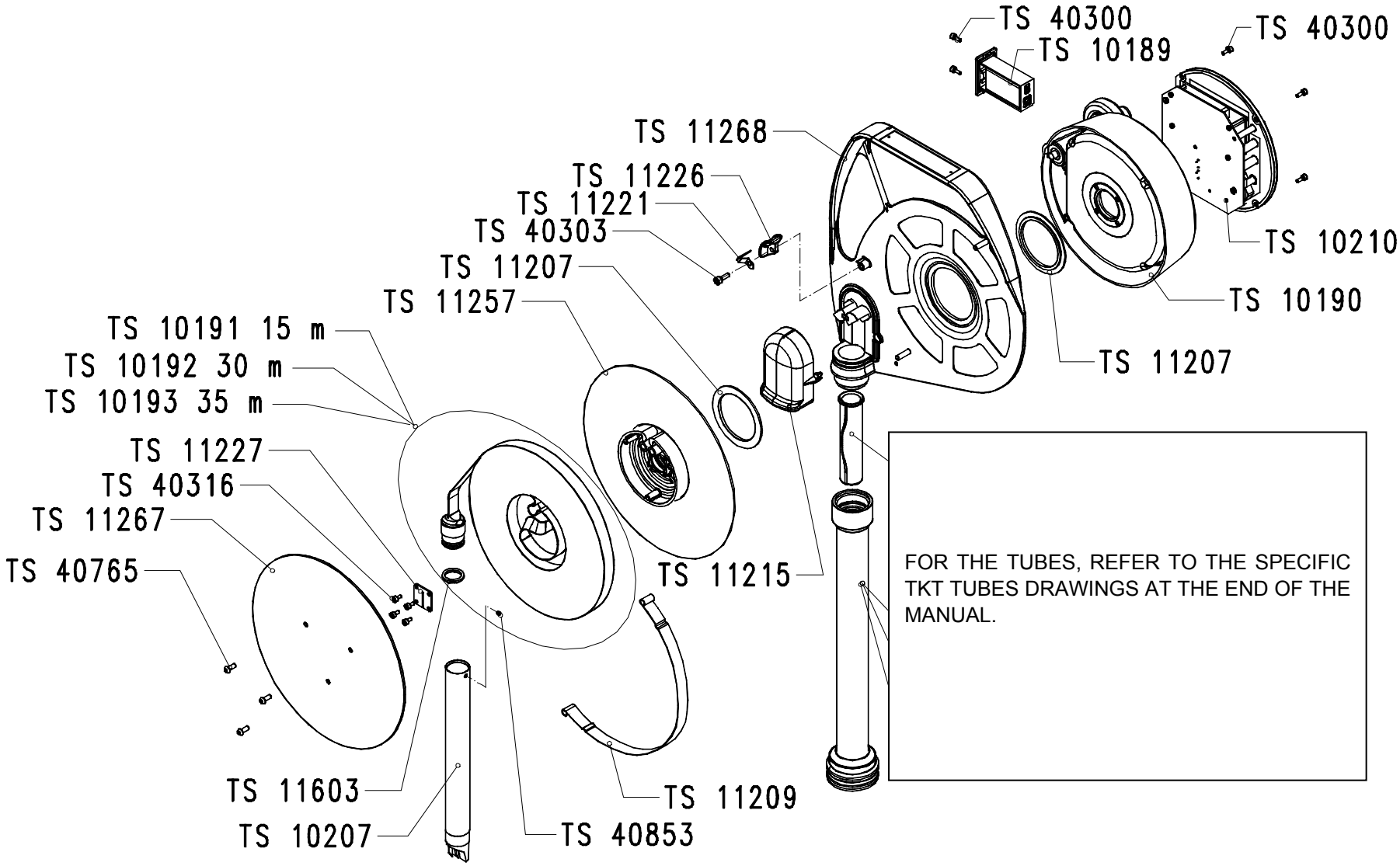


Figure 12-1 : general assembly, list of the main spare parts

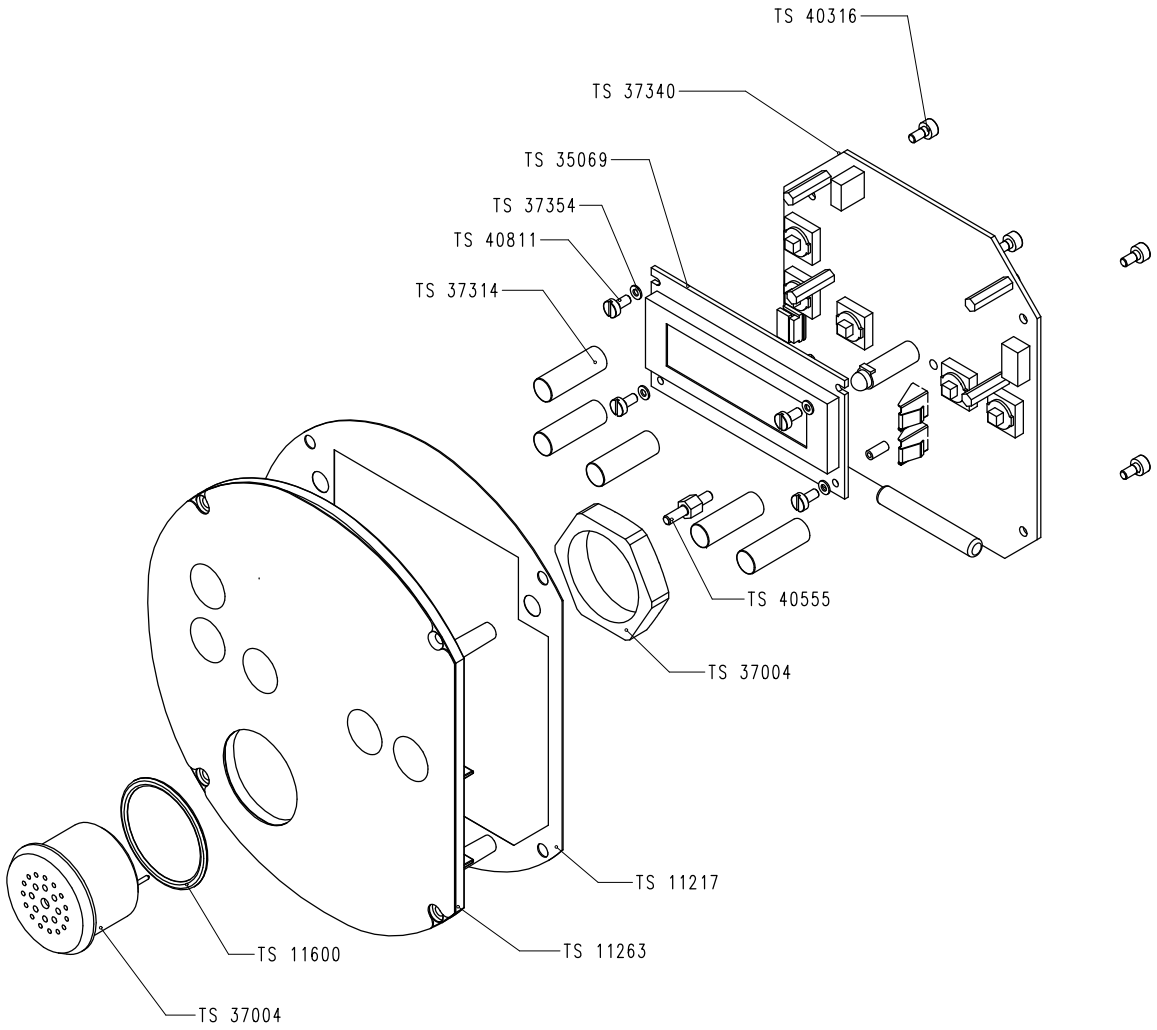


Figure 12-2: display unit assembly TS 10210, details

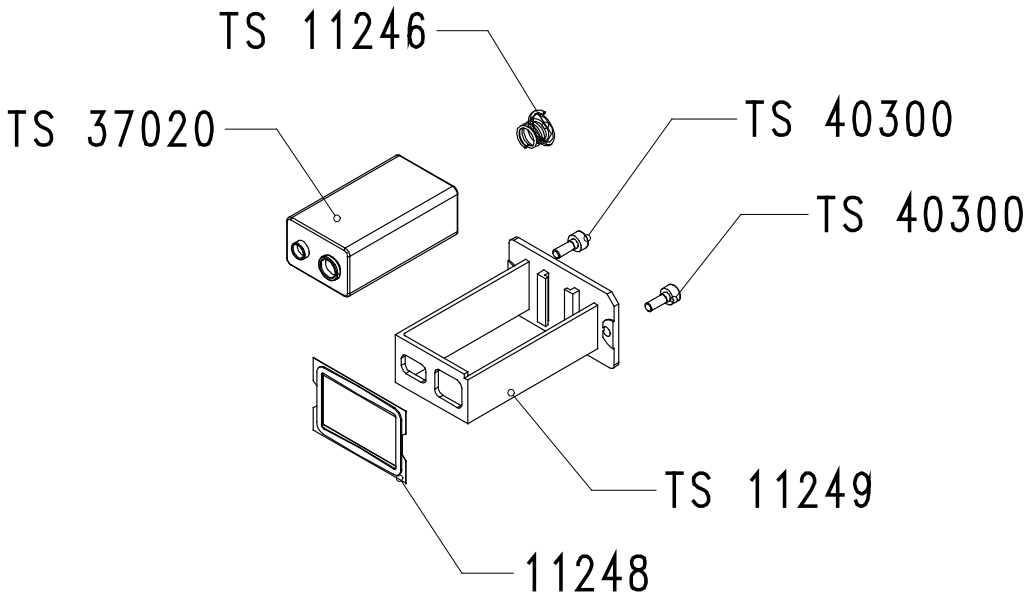


Figure 12-3: battery holder assembly TS 10189, details
(the screws TS 40300 are not included in the TS 10189 assembly; they shall be ordered separately)

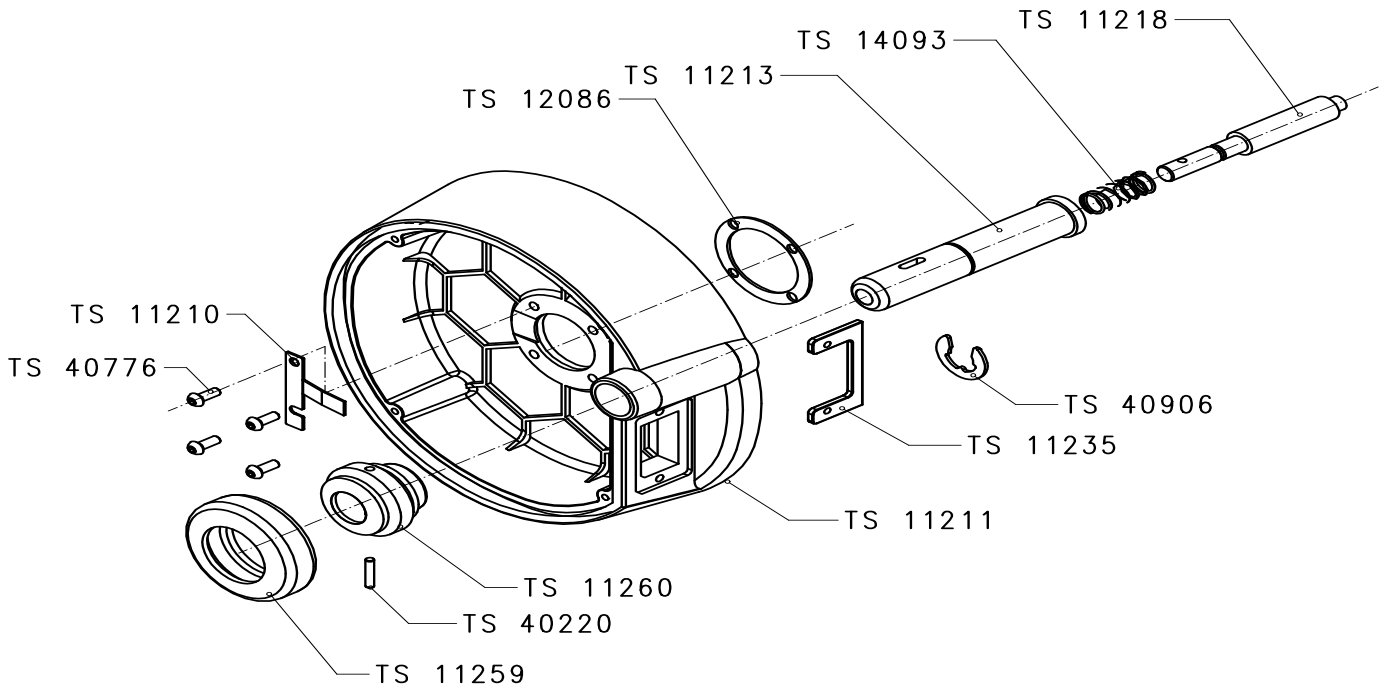


Figure 12-4: electronic box assembly TS 10190, details

(the screws TS 40765 and the plate TS 11210 are not included in the TS 10190 assembly; they shall be ordered separately)

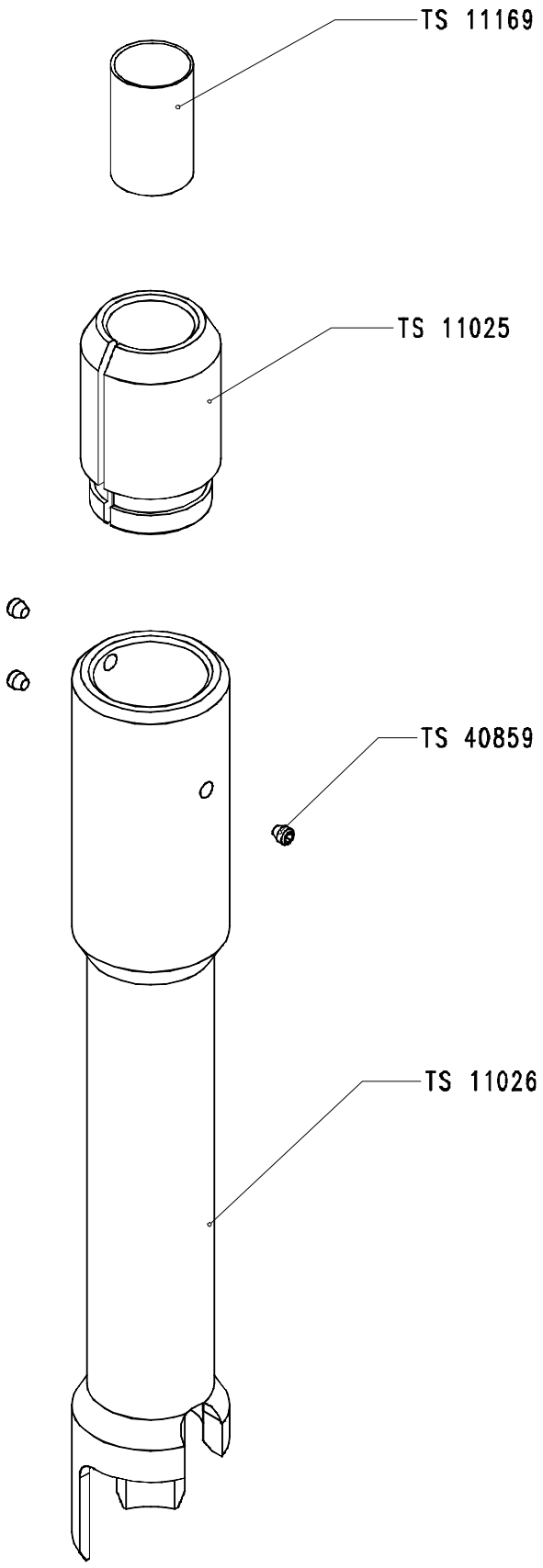


Figure 12-5: load, details

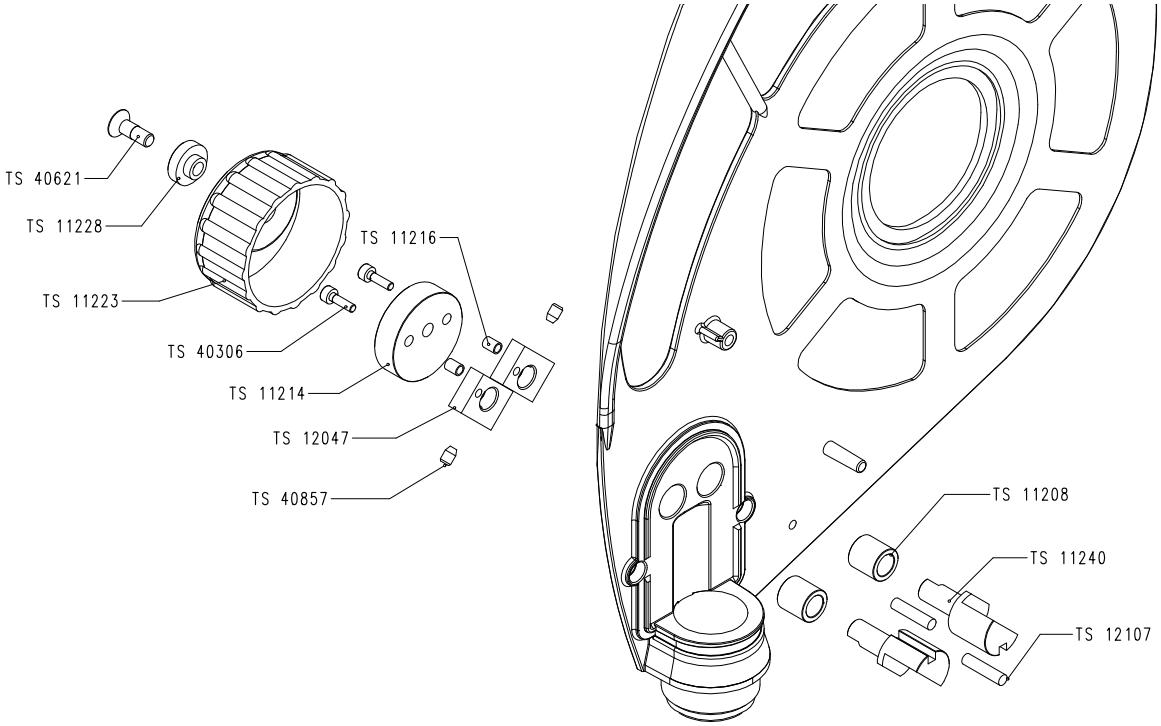
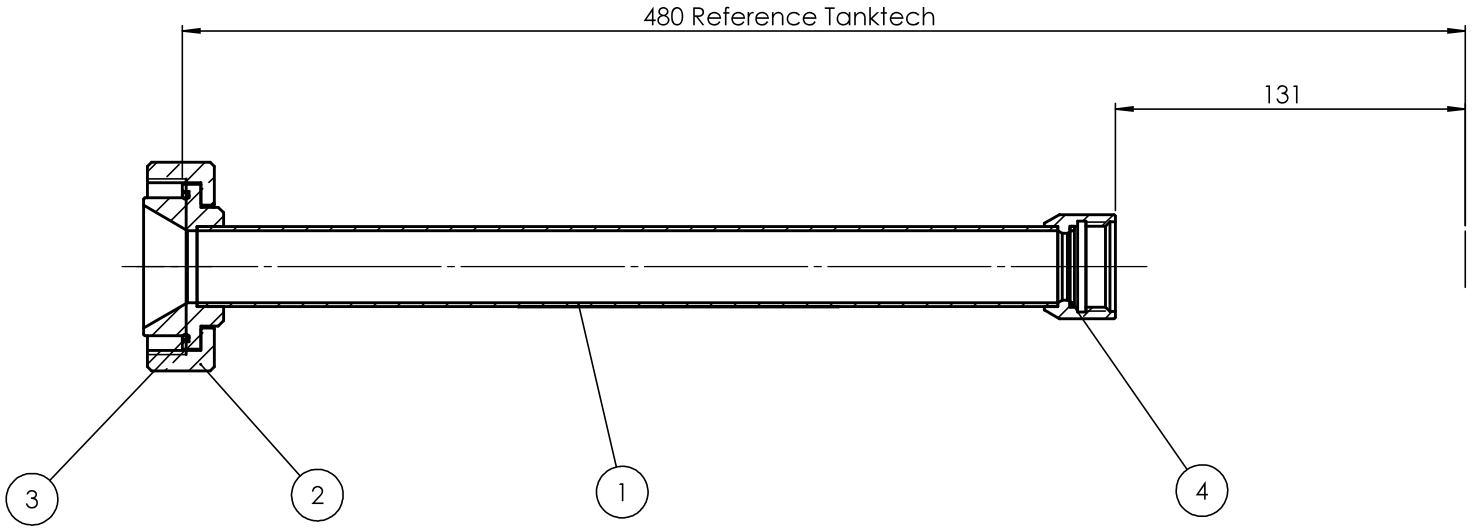
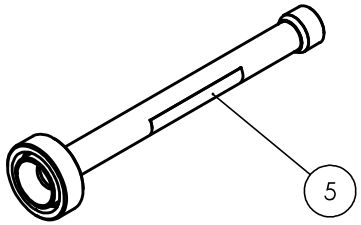


Figure 12-6: tape cleaner, details

ATEX Certified Product

No modifications permitted without the approval of the "authorised person"





Item	Qty	Weight	Description	Material	TS	ND
1	1	728.8	Storage tube brut		98165B	30778
2	1	414.1	Coupling nut G 2 ¼"	Brass	98153B	41229
3	1	0.9	O-Ring ø 50.47 x 2.62	FKM	55117	
4	1	0.2	O-Ring ø 26.7x1.78	FKM	11252	
5	1	0.2	Tube Label	-	50003	40331
6	1	80	Earth strap w/clamp assy	-	10100	40167

TOLERANCES UNLESS OTHERWISE SPECIFIED

Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

Weight: 1144.2 Eff.

REMOVE ALL BURRS AND SHARP EDGES

Drawn: CPI 12.08.2009

Control:

1:2

ISSUE 1 : 12.08.2009

MPSA YYYN

Replacement for: ND

Replaced by: ND

Speciality

Storage tube UTImeter assy Tanktech ref 480mm

TS 98165

ND 30777

REF ND

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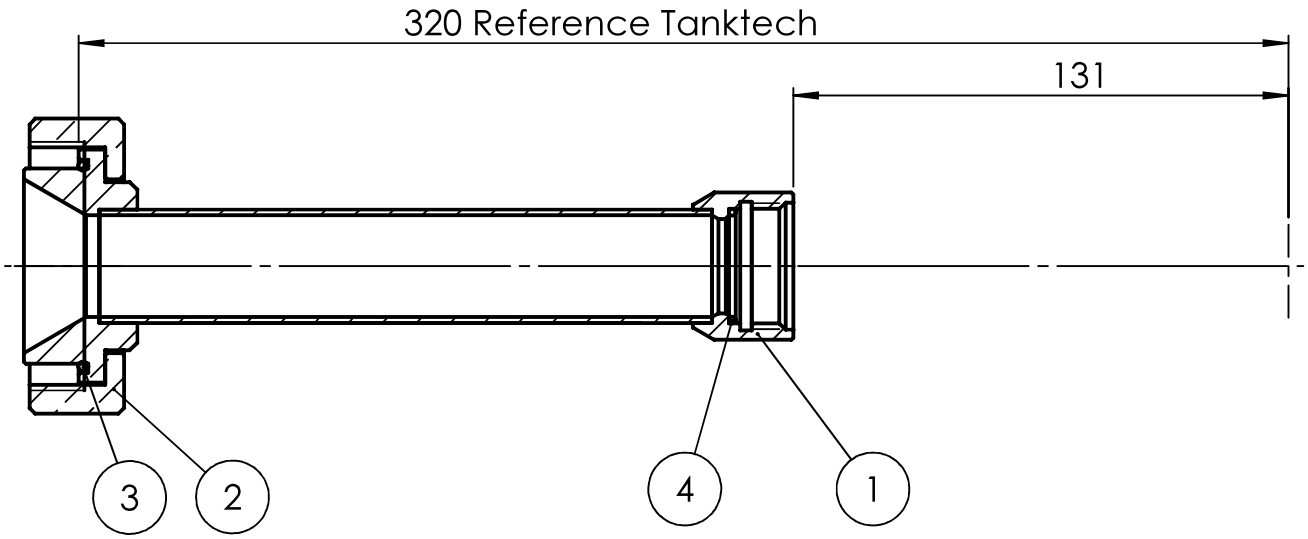
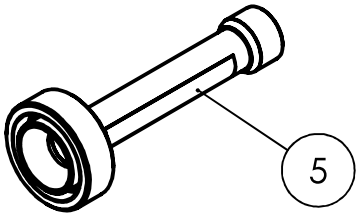
Enraf Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505

ATEX Certified Product

No modifications permitted without the approval of the "authorised person"





Item	Qty	Weight	Description	Material	TS	ND
1	1	556.9	Storage tube brut		98170A	41307
2	1	414.1	Coupling nut G 2 ¼"	Brass	98153B	41229
3	1	0.9	O-Ring ø 50.47 x 2.62	FKM	55117	
4	1	0.2	O-Ring ø 26.7x1.78	FKM	11252	
5	1	0.2	Tube Label	-	50003	40331
6	1	80.0	Earth strap w/ clamp assy	-	10100	40167

TOLERANCES UNLESS OTHERWISE SPECIFIED									
Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Drawn: CPI 12.08.2009

Control:

Weight: 972.3 Eff.

1:2

ISSUE 1 : 12.08.2009

MPSA YYYN

Replacement for: ND

Replaced by: ND

Speciality

Storage tube UTImeter Tanktech ref 320mm

TS 98170

ND 41306

REF ND

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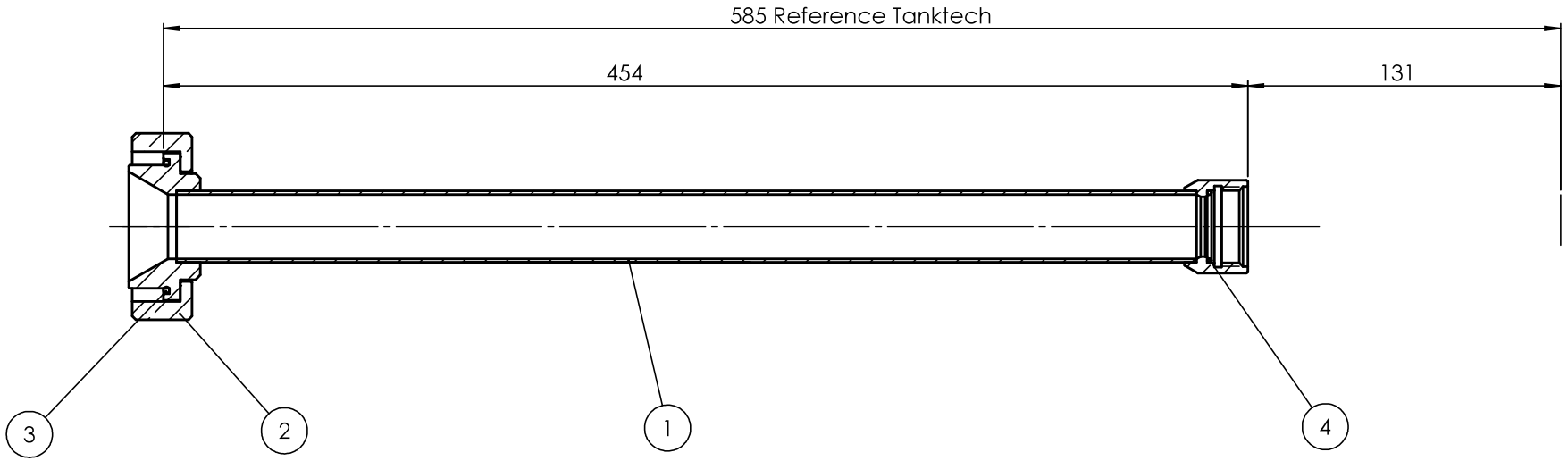

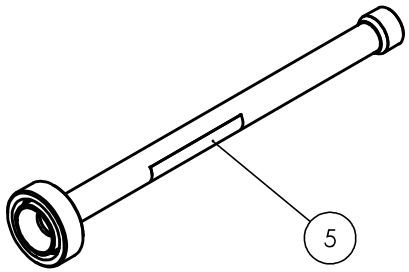

Item	Qty	Weight	Description	Material	TS	ND
1	1	841.6	Storage tube brut		98185A	30920
2	1	414.1	Coupling nut G 2 ¼"	Brass	98153B	41229
3	1	0.9	O-Ring ø 50.47 x 2.62	FKM	55117	
4	1	0.2	O-Ring ø 26.7x1.78	FKM	11252	
5	1	0.2	Tube Label	-	50003	40331
6	1	80	Earth strap w/clamp assy	-	10100	40167

TOLERANCES UNLESS OTHERWISE SPECIFIED

Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

Weight: 1257.0 Eff.

ISSUE 1 : 9.11.2009

REMOVE ALL BURRS AND SHARP EDGES

1:2

MPSA YYYN

Drawn: CPI 12.08.2009

Control:

Replacement for: ND

Replaced by: ND

Speciality

Storage tube UTImeter assy Tanktech ref 585 mm

TS 98185

ND 30921

REF ND

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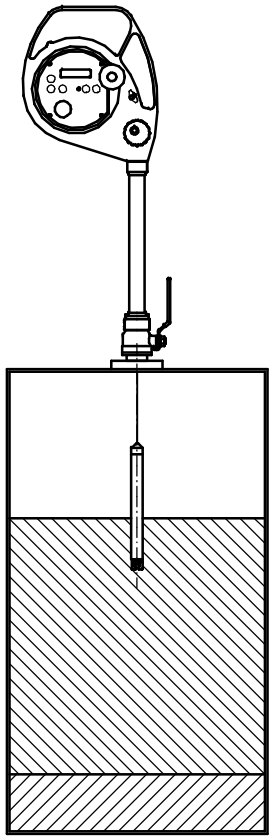
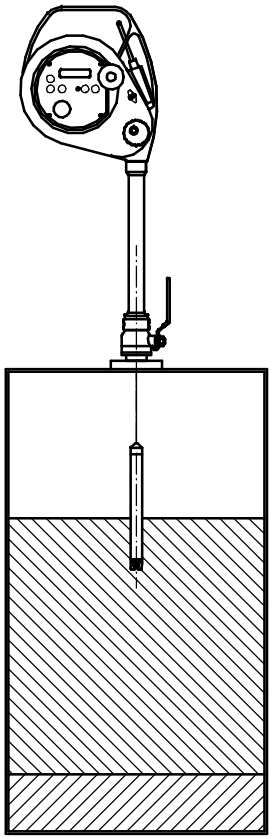
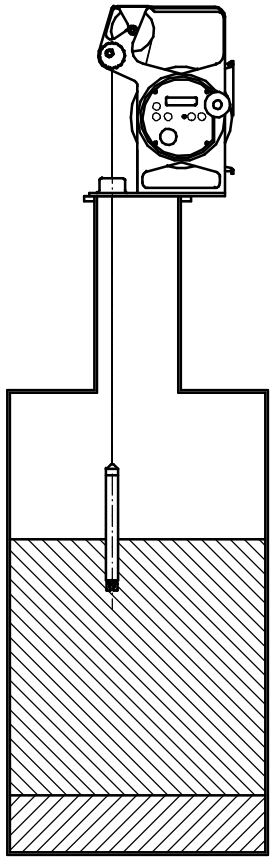
Rtex Restricted gauging



Gtex Closed gauging



Dtex Open gauging



FM Approvals
Controlled drawing
No changes without prior
FM approval

"Intrinsically Safe Class I, Division 1, Groups, C & D. and Class I,
Zone 0, AEx ia IIB T4; Maximum ambiant 50 Degrees Celsius"

Notes:

1. No revision to drawing without prior FM Approval

Warnings:

WARNING-Substitution of components may impair Intrinsic Safety
WARNING-To prevent ignition of flammable or combustible atmospheres, read, understand and adhere to the manufacturer's live maintenance procedures
WARNING-Battery shall not be removed or replaced in the hazardous location.

Modification	Visa	Date	Is

TOLERANCES UNLESS OTHERWISE SPECIFIED									
Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Weight: 0 Eff.

1:10

Drawn: CPI 16.12.2003

Control:

ISSUE 1 : 26.02.2004

MPSA

Replacement for: ND

Replaced by: ND

UTImeter control drawing

TS *****

ND 30779

REF ND

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Apparatus Identification **HERMetic UTImeter Gtex / Rtex / Otex**

Apparatus Classification Measurement Equipment

Statement of Conformity

Based on sample product test results using appropriate standards (industrial environment), and in accordance with the following EC Directives & IEC Standards, we, Enraf Tanksystem SA, hereby declare under our sole responsibility that the HERMetic UTImeter is in conformity with:

Gtex / Rtex / Otex	EC ATEX Directive 94/9/EC, Equipment and protective systems intended for use in potentially explosive atmospheres (ATEX). EC Type Examination Certificate: KEMA 02ATEX1097X + Amds 1 & 2 II 1 G EEx ia IIB T4 / Tamb 50°C
Gtex / Rtex / Otex	EC Directive 89/336/EEC, Electromagnetic Compatibility (EMC).
Gtex and Rtex only	EC Directive 96/98/EC on Marine Equipment (MED), as amended by Commission Directive 2002/75/EC.
Gtex / Rtex / Otex	IEC 60079, Electrical apparatus for explosive gas atmospheres. Zone 0 Ex ia IIB T4 -20°C < T_a < +50°C (maximum fluid process temperature +90°C)

Sample Product Testing for ATEX / IECEx

Tested by	Kema Quality B.V., Utrechtseweg 310, P.O. Box 5185, 6812 AR Arnhem, The Netherlands
Notified Body	Kema Quality B.V., Utrechtseweg 310, P.O. Box 5185, 6812 AR Arnhem, The Netherlands
Notified Body Number	0344
ATEX Standards Used	EN50014, (1997) + Amds 1 & 2, Electrical apparatus for potentially explosive atmospheres – General requirements EN 60079-0, Fourth Edition 2004-01, Electrical apparatus for explosive gas atmospheres, Part 0: General requirements A review against EN 60079-0:2006, which is harmonised, shows no significant changes relevant to this equipment so EN 60079-0, Fourth Edition 2004-01 continues to represent "State of the Art". EN50020, (2002) Electrical apparatus for potentially explosive atmospheres - Intrinsic safety "I" EN50284, (1999) Special requirements for construction, test and marking of electrical apparatus of equipment group II, Category 1 G
Report ID	KEMA 2018044
IECEx Standards Used	IEC 60079-0, Fourth Edition 2004-01, Electrical apparatus for explosive gas atmospheres, Part 0: General requirements A review against EN 60079-0:2006, which is harmonised, shows no significant changes relevant to this equipment so EN 60079-0, Fourth Edition 2004-01 continues to represent "State of the Art". IEC 60079-11, Fifth edition 2006-07, Electrical apparatus for explosive gas atmospheres, Part 11: Intrinsic safety "I" IEC 60079-26, First edition 2004-03, Electrical apparatus for explosive gas atmospheres, Part 26: Construction, test and marking of Group II Zone 0 electrical apparatus
Report ID	KEMA NL/KEM/ExTR06.0047/00
Quality Assurance notification & IECEx Quality Assessment Report	Baseefa ATEX 1536
Notified Body	Baseefa, Rockhead Business Park, Staden Lane, Buxton, Derbyshire, SK17 9RZ. United Kingdom
Notified Body Number	1180

Sample Product Testing for EMC

Tested by	Montena EMC SA, Zône industrielle, 1728 Rossens, Switzerland
Standards Used	EN61326-1, (2002-02) Electrical equipment for measurement, control and laboratory use - EMC requirements - General requirements
Report ID	EMC - Tests on the Hermetic UTImeter Gtex No. 13'381 issued 17.07.2003 EMC - Tests on the Hermetic UTImeter Otex No. 13'382 issued 31.07.2003

Sample Product Testing for MED

Tested by	See-Berufsgenossenschaft, Reimerstwiete 2, 20457 Hamburg, Germany		
Standards Used	IMO-Resolution MEPC.5(XIII)	*Report ID*	334006 issued 01 July 2003
Notified Body	Det Norske Veritas AS	*Notified Body Number*	0575
EC Type-Examination Certificate	MED-B-5034	issued on 3 February 2009	
QS - Certificate of Assessment - EC	MED-D-1114	issued on 3 February 2009	

Manufacturer **ENRAF TANKSYSTEM SA,** Rue de l'Industrie 2, 1630 BULLE, Switzerland

Philippe Despagne
General Manager

9/2/2009

Created / modified		Approved	Released	Remarks
7	2008/08/28	2008/09/03	2008/09/03	Update of ATEX references & integration of IECEx declaration
8	2009/02/09	2009/02/10	2009/02/10	Update of MED-D & MED-B references

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